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Prescribing Patterns of Antidiabetic Agents and Glycemic Control in Type 2 Diabetes Mellitus Patients

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ABSTRACT

Introduction

Despite the availability of several effective classes of antidiabetic drugs, many Type 2 diabetes mellitus (T2DM) patients continue to have inadequate glycemic control. This study aimed to assess the prescribing patterns of antidiabetic agents and evaluate glycemic control in T2DM patients.

Methods

A descriptive cross-sectional study was conducted in Medicine outpatient department of tertiary care hospital. Patient demographic profile, antidiabetic medicine, number of antidiabetic medicine, blood HbA1c were recorded in a pre-designed proforma. The collected data was analyzed with SPSS software version 16.00.

Result

Out of 148 patients, female patients constituted a higher proportion of the study population (83, 56.1%) and common age group ranging from 51-60 years (45, 30.4%). Biguanides were the most frequently prescribed antidiabetic agents (134, 90.5%). Dual therapy was the most commonly prescribed regimen (54, 36.5%), where the combination of metformin and sulfonylureas was the most frequently used regimen (22, 14.9%). HbA1c levels showed that only 66 (44.6%) of patients had good glycemic control.

Conclusion

Metformin-based therapy remained the cornerstone of T2DM management; however, a considerable proportion of patients fail to achieve optimal glycemic control.

Keywords

Antidiabetic agents; diabetes mellitus; glycemic control; HbA1c; prescribing patterns

INTRODUCTION

Type 2 diabetes mellitus (T2DM) is a chronic metabolic disorder and a major global public health challenge that requires appropriate pharmacological management to achieve optimal glycemic control and reduce the risk of long-term complications.[1] Prescription pattern analysis is a valuable approach for assessing the rational use of medicines, evaluating prescribing practices, and identifying areas for improvement in diabetes management.[2]

Therapeutic management of T2DM has advanced considerably with the availability of several classes of antidiabetic medications that act through different mechanisms to improve glycemic control.[3] Appropriate selection and rational use of these medications are crucial for achieving treatment goals and minimizing the risk of diabetes-related microvascular and macrovascular complications.[4,5] Nevertheless, despite the availability of effective pharmacological therapies, a significant proportion of patients with T2DM fail to achieve recommended glycemic targets.[6,7]

Evaluating current prescribing patterns and their association with glycemic control is therefore essential for assessing the effectiveness of diabetes management and promoting rational prescribing practices. So, the aim of the study was to assess the prescribing patterns of antidiabetic agents and evaluate the glycemic control in T2DM patients.

METHODS

This was a descriptive cross-sectional study, conducted in Nepal Medical College Teaching Hospital (NMCTH), Attarkhel, Gokarneshwor-8, Kathmandu for the month of December 2025-March 2026, after the ethical approval from Institutional Ethics Committee. This study was carried out in patients with Type 2 DM attending in Medicine out-patient department.

Sample size was determined by the formula $n=(z^2\times p\times q)/d^2$), where 'p' is the prevalence of good glycemic control taken as 25.2%[8] and margin of error 7%, producing the minimum sample size of 148. Patients ageed above 18 years; patient taking antidiabetic medicine for at least 3 months were include in this study. Patient with Type 1 DM, newly diagnosed Type 2 DM, pregnant and lactating mother, severe comorbid conditions affecting glycemic control were excluded from the study. Informed consent was taken from the participants. Patient demographic profile, antidiabetic medicine, number of antidiabetic medicine was filled up in a pre-designed proforma. Blood HbA1c was recorded and categorize as good (<7%), inadequate (7-8%), and poor control (>8%).[9]

The collected data was analyzed with SPSS software version 16.00. The result was expressed in number and percentage. Chi-square test was used to find the association among the variables and *p*-value <0.05 was considered as statistically significant.

RESULT

A total of 148 patients with type 2 diabetes mellitus (T2DM) were included in the study. The demographic characteristics of the study participants are presented in Table 1. A higher proportion of the study population constituted female patients (56.1%) and the age group between 51–60 years (30.4%). Most participants were illiterate (58.1%). Regarding the duration of antidiabetic therapy, 33.8% of patients had been receiving treatment for 1–5 years. Coexisting diseases were present in 65.5% of patients, with hypertension being the most common comorbidity (49.3%). Assessment of glycemic control using HbA1c revealed that 44.6% of patients had good glycemic control.

Table 1. Demographic profile of the patient (n=148)

Characteristics	No. (%)
Gender	
Female	83 (56.1)
Male	65 (43.9)
Age (years)	
31-40	13 (8.8)
41-50	37 (25)
51-60	45 (30.4)
61-70	35 (23.6)
70-80	17 (11.5)
>81 years	1 (0.7)
Education	
Illiterate	86 (58.1)
Primary	31 (20.9)
Secondary	21 (14.2)
Tertiary	10 (6.8)

Duration of antidiabetic used	
<1 year	34 (23)
1-5 years	50 (33.8)
5-10 years	31 (20.9)
>10 years	33 (22.3)
Coexisting disease*	
Absent	51 (34.5)
Present	97 (65.5)
Hypertension	73 (49.3)
Dyslipidemia	39 (26.4)
Benigh Enlargement of Prostate	8 (5.4)
Hypothyroidism	6 (4.1)
COPD	7 (4.7)
Gout	5 (3.4)
Coronary artery disease	4 (2.7)
Myocarditis	1 (0.7)
Asthma	1 (0.7)
Parkinsonism	1 (0.7)
HBA1C control	
Good (<7)	66 (44.6)
Inadequate (7-8)	36 (24.3)
Poor (>8)	46 (31.1)

**One or more coexisting disease were present in one patient*

The pattern of antidiabetic drug utilization is shown in Table 2. Biguanides were the most frequently prescribed class, with metformin being prescribed in 90.5% of patients. DPP-4 inhibitors were the second most commonly used class (42.6%), predominantly linagliptin (39.2%).

Table 2. Antidiabetic medications used in type II DM patients (n=148)

Drug Class	No. (%)
Insulin	22 (14.9)
Biguanides	134 (90.5)
Metformin	134 (90.5)
Suphonylureas	50 (33.8)
Glimepiride	47 (31.8)
Gliclazide	3 (2)
DPP-4 inhibitors	63 (42.6)
Linagliptin	58 (39.2)
Sitagliptin	4 (2.7)
Tenegliptin	1 (0.7)
α-glucosidase inhibitors	32 (21.6)
Voglibose	32 (21.6)
SGLT-2 inhibitors	14 (9.5)
Dapagliflozin	10 (6.8)
Empagliflozin	4 (2.7)
PPAR-γ activator	2 (1.4)
Pioglitazone	2 (1.4)

Table 3 illustrates the number and combinations of antidiabetic drugs prescribed. The number of anti-diabetic drugs prescribed for each patient varied from one to five and the average number of antidiabetic drugs per prescription was 2.1. Dual therapy was the most commonly prescribed regimen (36.5%). The combination of metformin and sulfonylureas was the most frequently used regimen (14.9%).

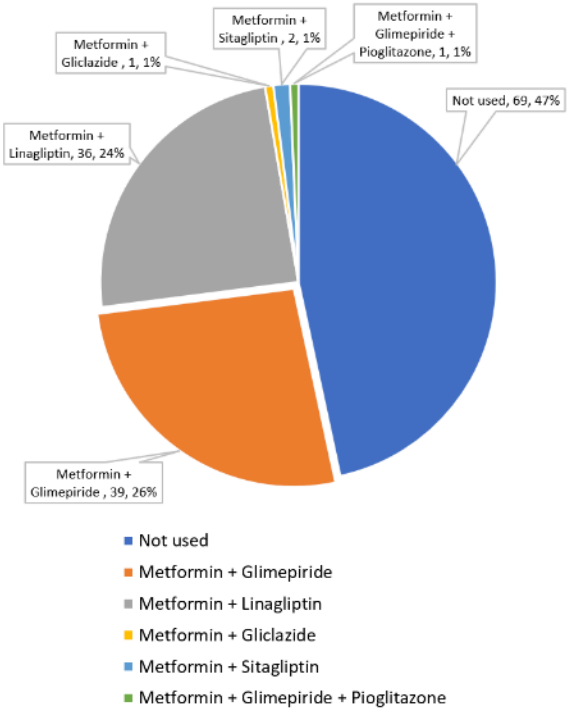

Figure 1. Fixed dose combinations used in combination therapy (n =118)

As shown in Figure 1, fixed-dose combinations (FDCs) were prescribed in 53.4% (79) of patients receiving combination therapy. The most commonly prescribed FDC was metformin plus glimepiride (26.4%), followed by metformin plus linagliptin (24.3%).

Table 3. Number of antidiabetic drugs prescribed in each prescription (n = 148)

Number of drugs prescribed in each prescription	N (%)
Single drug therapy	43 (29.1)
Insulin	3 (2)
Metformin	38 (25.7)
DPP4 inhibitors	2 (1.4)
Two-drugs therapy	54 (36.5)
Insulin+Metformin	4 (2.7)
Insulin+Sulphonylureas	1 (0.7)
Insulin+DPP4 inhibitors	2 (1.4)
Metformin + Sulphonylureas	22 (14.9)
Metformin+DPP4 inhibitors	17 (11.5)
Metformin+α-glucosidase inhibitors	4 (2.7)
Metformin+SGLT2 inhibitors	1 (0.7)
Sulphonylureas + SGLT2 inhibitors	1 (0.7)
DPP4 inhibitors + α-glucosidase inhibitors	2 (1.4)
Three-drugs therapy	39 (26.4)
Insulin + Metformin +DPP4 inhibitors	7 (4.7)
Insulin + Metformin + α-glucosidase inhibitors	1 (0.7)
Insulin +DPP4 inhibitors + α-glucosidase inhibitors	1 (0.7)
Metformin + Sulphonylureas DPP4 inhibitors	9 (6.1)
Metformin + Sulphonylureas + α-glucosidase inhibitors	4 (2.7)
Metformin + Sulphonylureas +SGLT2 inhibitors	2 (1.4)
Metformin + Sulphonylureas + PPAR-γ activator	1 (0.7)
Metformin +DPP4 inhibitors + α- glucosidase inhibitors	6 (4.1)
Metformin + DPP4 inhibitors +SGLT2 inhibitors	4 (2.7)
Metformin + DPP4 inhibitors + PPAR-γ activator	1 (0.7)
Metformin + α-glucosidase inhibitors + SGLT2 inhibitors	1 (0.7)
Sulphonylureas + DPP4 inhibitors + α-glucosidase inhibitors	1 (0.7)
Sulphonylureas + DPP4 inhibitors + SGLT2 inhibitors	1 (0.7)
Four-drugs therapy	11 (7.4)
Insulin + Metformin + DPP4 inhibitors + α-glucosidase inhibitors	2 (1.4)
Metformin + Sulphonylureas+ DPP4 inhibitors + α-glucosidase inhibitors	5 (3.4)
Metformin + Sulphonylureas + α-glucosidase inhibitors +SGLT2 inhibitors	2 (1.4)
Metformin + DPP4 inhibitors α-glucosidase inhibitors + SGLT2 inhibitors	2 (1.4)
Five-drugs therapy	1 (0.7)
Insulin + Metformin + Sulphonylureas + DPP4 inhibitors + α-glucosidase inhibitors	1 (0.7)

Table 4 demonstrates the association between antidiabetic therapy and glycemic control. A statistically significant association was observed between the duration of antidiabetic use and HbA1c control (p = 0.048). Patients with a shorter duration of treatment (<1 year) showed better glycemic control compared to those receiving therapy for longer durations. Similarly, the number of antidiabetic drugs used was significantly associated with HbA1c control (p = 0.009), with patients receiving monotherapy exhibiting better glycemic control than those receiving multiple drug regimens. Although a higher proportion of insulin users had poor glycemic control compared to non-insulin users, the association between insulin use and HbA1c control was not statistically significant (p = 0.079).

Table 4. Association between antidiabetic used and HbA1c control

Antidiabetic drugs use characteristics	HbA1c control			P value
	Good control	Inadequate	Poor control	
Duration of antidiabetics used				
<1 year	22	7	5	0.048
1-5 years	24	11	15	
5-10 years	12	8	11	
>10 years	8	10	15	
Number of antidiabetics used				
Single drug	30	5	8	0.009
Two drugs	20	18	16	
Three drugs	13	4	4	
Four drugs	3	4	4	
Five drugs	0	0	1	
Insulin used				
Yes	5	7	10	0.079
No	61	29	36	

DISCUSSION

This study evaluated the prescribing patterns of antidiabetic medications and their association with glycemic control among patients with type 2 diabetes mellitus (T2DM). Female patients formed a greater proportion of the study population than males. Similar female predominance has been reported in several studies, which may reflect greater healthcare-seeking behavior among women and demographic variations in the study population.[10,11]

Majority of participants were between 51 and 60 years, highlighting the increased prevalence of T2DM among middle-aged and elderly populations. Advanced age is a recognized risk factor for T2DM because of age-related insulin resistance, progressive decline in pancreatic β-cell function, and existence of comorbid conditions.[12]

In this study, only 44.6% of patients achieved good glycemic control, whereas more than half had inadequate or poor glycemic control. This finding indicates suboptimal diabetes management and emphasizes the need for regular monitoring, lifestyle modification, and optimization of pharmacotherapy.[13]

Metformin was the most frequently prescribed antidiabetic medication, either as monotherapy or in combination with other agents. This prescribing pattern is consistent with the recommendations of the American Diabetes Association (ADA), which recommends metformin as an effective initial pharmacological therapy for most patients with T2DM because of its efficacy, safety profile, low risk of hypoglycemia, and cost-effectiveness.[4] Dual therapy was the most commonly prescribed treatment regimen, suggesting that monotherapy alone was insufficient to achieve glycemic targets in many patients.

The relatively frequent use of DPP-4 inhibitors and sulfonylureas in combination with metformin reflects current trends in clinical practice in management of patients requiring additional glycemic control. Conversely, the lower use of SGLT-2 inhibitors and PPAR-γ agonists may be attributed to their higher cost, limited availability, concerns regarding adverse effects, and physician prescribing preferences.[4]

More than half of the patients received fixed-dose combinations (FDCs), predominantly metformin plus glimepiride or metformin plus linagliptin. The use of FDCs may improve medication adherence and simplify treatment regimens by reducing pill burden.[14]

A significant association was observed between the duration of antidiabetic therapy

and glycemic control. Patients receiving treatment for a longer duration were more likely to exhibit poor glycemic control. This finding may be explained by the progressive nature of T2DM, characterized by gradual decline in pancreatic β-cell function and worsening insulin resistance over time.[15]

The number of antidiabetic drugs prescribed was also significantly associated with HbA1c control. Patients receiving monotherapy demonstrated better glycemic control than those receiving multiple drug regimens. This observation likely reflects disease severity, as patients with longstanding or poorly controlled diabetes often require treatment intensification with multiple medications .[4]

Although insulin users exhibited a higher proportion of poor glycemic control, the association between insulin use and HbA1c status was not statistically significant. Poor glycemic control among insulin users may be due to insulin being used predominantly in patients with advanced disease, severe hyperglycemia, or inadequate response to oral antidiabetic medications.[16]

CONCLUSION

Overall, metformin-based therapy was the cornerstone of T2DM management. However, a considerable proportion of patients failed to achieve optimal glycemic control. Patients with a shorter duration of treatment (<1 year) and patients receiving monotherapy showed better glycemic control This highlights the need for individualized treatment strategies, regular follow-up, and comprehensive patient education to improve glycemic outcomes.

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CONFLICT OF INTEREST

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AUTHOR CONTRIBUTIONS

DS : research concept and design, data collection, data analysis, manuscript preparation, manuscript review

RSY : research concept, data collection, data analysis, manuscript preparation

RP : data collection, manuscript preparation, manuscript review

RSG : data collection, manuscript preparation, manuscript review

REFERENCES

1. American Diabetes Association Professional Practice Committee. Standards of care in diabetes—2026. Diabetes Care. 2025;49(Suppl 1).
2. World Health Organization. How to investigate drug use in health facilities: selected drug use indicators. Geneva: World Health Organization; 1993.
3. Davies MJ, Aroda VR, Collins BS, et al. Management of hyperglycemia in type 2 diabetes, 2022. A consensus report by the American Diabetes Association and the European Association for the Study of Diabetes. Diabetes Care. 2022;45(11):2753-2786.
4. American Diabetes Association Professional Practice Committee. Pharmacologic approaches to glycemic treatment: Standards of Care in Diabetes—2026. Diabetes Care. 2025;49(Suppl 1).
5. Khunti K, Zaccardi F, Amod A, et al. Glycaemic control is still central in the hierarchy of priorities in type 2 diabetes management. Diabetologia. 2025;68(1):17-28. doi:10.1007/s00125-024-06254-w.
6. Khunti K, Ceriello A, Cos X, et al. Achievement of guideline targets for blood pressure, lipid, and glycaemic control in type 2 diabetes: a meta-analysis. Diabetes Res Clin Pract. 2018;137:137-148.
7. Bin Rakhis SA, AlDuwayhis N, Aleid N, et al. Glycemic control for type 2 diabetes mellitus patients: a systematic review. Cureus. 2022;14(6). doi:10.7759/cureus.26180.
8. Jha BK, Mishra R, Singh JK, et al. Assessment of glycemic control and correlation of HbA1c level with lipid profile and duration of diabetes in type 2 diabetes mellitus patients. Janaki Med Coll J Med Sci. 2024;12:13-24. doi:10.3126/jmcjms.v12i02.68365.
9. Jamali A, Ram N, Karim S, Sattar S, et al. Prescribing patterns of antidiabetic drugs and glycaemic control in type 2 diabetes patients visiting tertiary care hospital based in Karachi, Pakistan. Int J Community Med Public Health. 2023;10:4082-4088. doi:10.18203/2394-6040.ijcmph20233433.
10. Umar Hasan S, Rehman Siddiqui MA. Nationwide prevalence of type 2 diabetes mellitus and pre-diabetes in Pakistan: a systematic review and meta-analysis. Diabetes Res Clin Pract. 2024;216:111815. doi:10.1016/j.diabres.2024.111815.
11. Puig-García M, Caicedo-Montaño C, Márquez-Figueroa M, et al. Prevalence and gender disparities of type 2 diabetes mellitus and obesity in Esmeraldas, Ecuador: a population-based survey in a hard-to-reach setting. Int J Equity Health. 2023;22:124. doi:10.1186/s12939-023-01939-x.
12. Fazeli PK, Lee H, Steinhauser ML. Aging is a powerful risk factor for type 2 diabetes mellitus independent of body mass index. Gerontology. 2020;66(2):209-210. doi:10.1159/000501745.
13. American Diabetes Association Professional Practice Committee. Glycemic goals and hypoglycemia: Standards of Care in Diabetes—2026. Diabetes Care. 2025;49(Suppl 1).

14. Böhm AK, Schneider U, Aberle J, et al. Regimen simplification and medication adherence: fixed-dose versus loose-dose combination therapy for type 2 diabetes. PLoS One. 2021;16(5). doi:10.1371/journal.pone.0250993.

15. Zhu M, Liu X, Liu W, Lu Y, et al. -cell aging and age-related diabetes. Aging (Albany NY). 2021;13(5):7691-7706. doi:10.18632/aging.202593.

16. Gieroba B, Kryska A, Sroka-Bartnicka A. Type 2 diabetes mellitus—conventional therapies and future perspectives in innovative treatment. Biochem Biophys Rep. 2025;42:102037. doi:10.1016/j.bbrep.2025.102037.