



Original Article

Prescribing Pattern of Antidiabetic Drugs in Patients with Type 2 Diabetes Mellitus of a District Hospital in Maharashtra

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ABSTRACT

Introduction: Type 2 Diabetes Mellitus (T2DM) is a major public health problem associated with significant morbidity, mortality, and economic burden. Drug utilization studies help evaluate prescribing practices and promote rational use of antidiabetic medications. The present study aimed to evaluate the prescribing pattern of antidiabetic drugs among patients with T2DM attending the Non-Communicable Disease (NCD) clinic of a district hospital in Maharashtra.

Materials and Methods: A cross-sectional observational study was conducted in January 2026 among patients attending the Non-Communicable Disease (NCD) clinic at the Outpatient Department of District Hospital Nanded. A total of 189 prescriptions of patients with T2DM were analyzed over a period of four weeks. Data regarding demographic characteristics, co-morbidities, prescribed antidiabetic drugs, and prescribing indicators were collected using a predesigned Case Record Form. Prescribing patterns were assessed using World Health Organization (WHO) core prescribing indicators. Statistical analysis was performed using SPSS version 26.

Results: The majority of patients belonged to the 61–70 years age group (33.3%), and females constituted 70.9% of the study population. Hypertension was the most common co-morbidity, observed in 56.6% of patients. Among antidiabetic drugs, the combination of metformin and glimepiride was the most frequently prescribed regimen (58.2%), followed by metformin monotherapy (40.2%). A total of 1050 drugs were prescribed, with an average of 5.55 drugs per prescription. Polytherapy was more common than monotherapy. All medications were prescribed by generic name and administered through the oral route. No parenteral preparations were prescribed.

Conclusion: Combination therapy with metformin and glimepiride was the predominant prescribing pattern observed in the study. The prescribing practices reflected adherence to rational drug use principles and WHO prescribing indicators. Regular prescription audits are important to ensure rational and cost-effective management of T2DM.

Keywords: Type 2 Diabetes Mellitus; Antidiabetic drugs; Prescribing pattern; Drug utilization study; Polytherapy.

INTRODUCTION

Diabetes mellitus is one of the most common chronic metabolic disorders and has emerged as a major public health problem worldwide [1]. Type 2 Diabetes Mellitus (T2DM), characterized by insulin resistance and impaired insulin secretion, accounts for the majority of diabetes cases globally [2]. The prevalence of diabetes has increased rapidly due to urbanization, sedentary lifestyle, unhealthy dietary habits, obesity, and population aging [3]. According to the

International Diabetes Federation (IDF), India carries a substantial burden of diabetes and is considered one of the countries with the highest number of diabetic patients [4]. The increasing prevalence of T2DM poses a significant challenge to healthcare systems because of its long-term complications, morbidity, mortality, and economic burden [5].

The World Health Organization (WHO) has projected a considerable rise in diabetes-related mortality over the coming decades, with diabetes expected to become one of the leading causes of death worldwide [6]. Poor glycaemic control in diabetic patients is associated with microvascular and macrovascular complications such as nephropathy, neuropathy, retinopathy, hypertension, cardiovascular diseases, and dyslipidemia [7]. Appropriate and timely pharmacological management, including the use of oral hypoglycaemic agents and insulin, plays a crucial role in achieving optimal glycaemic control and preventing complications [8].

Rational prescribing of antidiabetic drugs is essential for effective disease management and improved patient outcomes [9]. Rational use of medicines refers to prescribing medications appropriate to the clinical needs of patients, in proper doses, for an adequate duration, and at the lowest possible cost [10]. Evaluation of prescribing practices through drug utilization studies helps in assessing the pattern, quality, and appropriateness of drug use in healthcare settings [11]. The WHO has defined drug utilization research as the study of marketing, distribution, prescription, and use of drugs in society with special emphasis on their medical, social, and economic consequences [12].

Drug utilization studies focusing on antidiabetic agents provide valuable information regarding current prescribing trends, extent of polypharmacy, use of generic drugs, and adherence to standard treatment guidelines [11]. Such studies are particularly important in government healthcare institutions and district hospitals where large numbers of patients receive treatment. Understanding the prescribing pattern of antidiabetic drugs can help identify areas requiring improvement and promote rational drug therapy. Therefore, the present study aimed to evaluate the prescribing pattern of antidiabetic drugs among patients with Type 2 Diabetes Mellitus attending the NCD clinic of a district hospital in Maharashtra.

MATERIALS AND METHODS

This cross-sectional observational study was conducted from January 2026 among patients attending the Non-Communicable Disease (NCD) clinic at the Outpatient Department (OPD) of District Hospital Nanded over a study period of four weeks. The study aimed to evaluate the prescribing pattern of antidiabetic drugs among patients with Type 2 Diabetes Mellitus (T2DM).

The study population included patients diagnosed with Type 2 Diabetes Mellitus attending the NCD clinic during the study period. Using a complete enumeration method, all eligible patients visiting the clinic during the study duration were included in the study.

Patients of either gender diagnosed with Type 2 Diabetes Mellitus, with or without associated complications and comorbid conditions, and willing to provide informed consent were included in the study. Patients receiving treatment from alternative systems of medicine such as Ayurveda or Homeopathy, those unwilling to provide informed consent, and patients with Type 1 diabetes mellitus, gestational diabetes, or diabetes due to specific causes were excluded from the study.

Data were collected from OPD prescriptions and patient medical records using a predesigned Case Record Form (CRF). Information regarding demographic details, medical history, duration of diabetes, family history of diabetes, prescribed antidiabetic medications, associated comorbidities, and concomitant medications was recorded systematically.

Prescribing patterns were evaluated using the World Health Organization (WHO) core prescribing indicators. The indicators assessed included total number of antidiabetic drugs prescribed, average number of drugs prescribed per prescription, drugs prescribed by generic name, encounters with parenteral preparations, encounters with antibiotics, and drugs prescribed from the National Essential Medicines List.

Confidentiality of all patient-related information was strictly maintained throughout the study. Personal identifiers were not disclosed, and all collected data were kept secure and confidential by the investigators.

The study was initiated after obtaining approval from the Institutional Ethics Committee. The collected data were entered and analyzed using Microsoft Excel. Quantitative variables were expressed as frequencies and percentages.

RESULTS

A total of 189 prescriptions of patients with Type 2 Diabetes Mellitus were analyzed. The sociodemographic analysis showed that the majority of patients belonged to the 61–70 years age group (33.3%), followed by 51–60 years (25.3%). Female patients constituted a higher proportion of the study population (70.9%) compared to males (29.1%).

Hypertension was the most common co-morbidity associated with diabetes mellitus, observed in 56.6% of patients, while 32.8% had diabetes mellitus alone without associated co-morbidities (Table 1).

Table 1. Sociodemographic Characteristics of the Studied Patients (n = 189)

Characteristics	Category	n (%)
Age group (years)	21–30	4 (2.1)
	31–40	18 (9.5)
	41–50	34 (17.9)
	51–60	48 (25.3)
	61–70	63 (33.3)
	71–80	22 (11.6)
Gender	Male	55 (29.1)
	Female	134 (70.9)
Co-morbid diseases	DM only	62 (32.8)
	DM + Hypertension	107 (56.6)
	DM + Dyslipidemia	8 (4.2)
	DM + Hypertension + Dyslipidemia	12 (6.3)

Among the antidiabetic drugs prescribed, the combination of metformin and glimepiride was the most commonly used regimen, accounting for 58.2% of total prescriptions. Metformin monotherapy constituted 40.2% of prescriptions. Other combinations such as metformin with teneligliptin, metformin with pioglitazone, and glimepiride with pioglitazone were prescribed infrequently, each contributing 0.5% of the total prescriptions (Table 2).

Table 2. Pattern of Antidiabetic Drugs Prescriptions among the total prescriptions (n=189)

Name of Drug	Number of prescriptions with drug/ drug combinations	Percentage of the prescription/s (%)
Metformin alone	76	40.2
Metformin + Glimepiride	110	58.2
Metformin + Teneligliptin	1	0.5
Metformin + Pioglitazone	1	0.5
Glimepiride + Pioglitazone	1	0.5

A total of 1050 drugs were prescribed across 189 prescriptions, with an average of 5.55 drugs per prescription. Polytherapy was commonly practiced, whereas monotherapy was observed in only 0.5% of prescriptions. All drugs were prescribed by generic name and administered through the oral route. No fixed-dose combinations or parenteral preparations were prescribed, while oral antimicrobials were present in 4.7% of prescriptions (Table 3).

Table 3. Prescribing Indicators Among the Studied Prescriptions

Parameter	Value
Total number of drugs prescribed	1050
Average number of drugs prescribed per prescription	5.55
Prescriptions with monotherapy, n (%)	1 (0.5)
Prescriptions with polytherapy, n (%)	128 (67.7)
Drugs prescribed by generic name, n (%)	1050 (100)
Fixed dose combinations prescribed, n (%)	0 (0)
Prescriptions with parenteral preparations, n (%)	0 (0)
Prescriptions with oral preparations, n (%)	1050 (100)
Prescriptions with oral antimicrobials, n (%)	9 (4.7)

DISCUSSION

The present study evaluated the prescribing pattern of antidiabetic drugs among 189 patients with Type 2 Diabetes Mellitus (T2DM) attending the NCD clinic of a district hospital. The majority of patients belonged to the 61–70 years age group (33.3%), followed by 51–60 years (25.3%), indicating that T2DM was more prevalent among older adults. Comparable findings were reported by Vengurlekar et al. and Jain et al., who observed the highest prevalence of diabetes among patients aged 51–60 years [13,14]. Female patients constituted 70.9% of the study population, whereas Vengurlekar et al. reported a male predominance among diabetic patients [13]. Similarly, Anusha K N V also reported a higher proportion of male patients attending diabetic clinics [15]. Such variations in gender distribution may be due to differences in healthcare-seeking behaviour, sociodemographic characteristics, and regional population profiles.

Hypertension was the most common co-morbidity in the present study, affecting 56.6% of patients, while 6.3% had both hypertension and dyslipidemia. Similar observations were reported by Vengurlekar et al. and Jain et al., who identified hypertension as the most frequently associated co-morbidity among patients with T2DM [13,14]. Anusha et al. also reported a high burden of hypertension among diabetic patients and documented a mean baseline blood pressure of $148.6 \pm 12.4/92.1 \pm 8.6$ mmHg in individuals with coexisting T2DM and hypertension [15]. The frequent coexistence of diabetes and hypertension can be explained by shared risk factors such as obesity, insulin resistance, sedentary lifestyle, endothelial dysfunction, oxidative stress, chronic inflammation, and activation of the renin–angiotensin–aldosterone system. Since both disorders are lifestyle-related chronic metabolic diseases, they commonly occur together and significantly increase the risk of cardiovascular and renal complications [16,17]. [REF1, REF 2]

Among the antidiabetic medications prescribed, the combination of metformin and glimepiride was the most common regimen, accounting for 58.2% of prescriptions, while metformin monotherapy constituted 40.2%. Comparable findings were reported by Jain et al., who observed metformin-glimepiride combination therapy in 54.8% of patients, and by Tiwari et al., who found metformin combined with sulfonylureas to be the most frequently prescribed antidiabetic regimen [14,18]. Vengurlekar et al. similarly reported metformin and glimepiride among the most commonly prescribed antidiabetic agents [13]. Furthermore, Anusha KNV documented metformin use in 82% of patients and sulfonylurea use in 46% of patients with T2DM [15]. These findings suggest that metformin-based combination therapy continues to represent the preferred treatment approach in routine clinical practice.

Metformin emerged as the most commonly prescribed antidiabetic drug in the present study. Similar observations were reported by Vengurlekar et al., Sinha et al., Tiwari et al., and Anusha KNV, all of whom identified metformin as the most frequently utilized antidiabetic agent [13,15,18,19]. The widespread use of metformin is attributable to its proven efficacy in reducing HbA1c, low risk of hypoglycaemia, weight neutrality or modest weight reduction, favorable cardiovascular effects, long-term safety profile, and affordability [20,21]. In addition, metformin is included in essential medicine lists and is readily available through government healthcare facilities, making it an accessible and cost-effective first-line therapy for patients with T2DM.

Glimepiride was the most frequently prescribed add-on agent and was predominantly used in combination with metformin. Similar utilization patterns were reported by Vengurlekar et al., Tiwari et al., and Kombathula SA et al., where glimepiride was among the most commonly prescribed sulfonylureas [13,18,22]. The preference for glimepiride may be attributed to its potent glucose-lowering efficacy, convenient once-daily dosing schedule, lower incidence and severity of hypoglycaemia compared with older sulfonylureas such as glibenclamide, and extensive clinical evidence supporting its use as both monotherapy and combination therapy [23,24]. Furthermore, its low cost and widespread availability make it a practical option for intensifying glycaemic control in patients inadequately controlled with metformin alone. The complementary mechanisms of action of metformin and glimepiride provide effective glycaemic control, which likely explains the frequent use of this combination in the present study [25,26].

The prescribing indicators revealed that a total of 1050 drugs were prescribed across 189 prescriptions, with an average of 5.55 drugs per prescription. Polytherapy was observed in 67.7% of prescriptions, whereas monotherapy was prescribed in only 0.5% of cases. Similar findings were reported by Kothari et al., who documented a predominance of combination therapy among diabetic patients, and by Anusha et al., who reported combination therapy in 62% of patients compared with monotherapy in 38% [15,27]. The preference for combination therapy may be related to the progressive nature of T2DM, declining β -cell function over time, and the need to manage associated co-morbidities such as hypertension and dyslipidemia. Notably, all drugs in the present study were prescribed by generic name and administered through the oral route. Similar findings regarding predominant use of oral hypoglycaemic agents were reported by Sinha et al [19]. The 100% generic prescribing observed in the present study reflects excellent adherence to WHO prescribing indicators and promotes cost-effective healthcare delivery. Overall, the prescribing pattern observed in the present study aligns with current evidence-based recommendations, emphasizing rational prescribing, metformin-based combination therapy, and comprehensive management of diabetes and its associated co-morbidities.

Strengths and Limitations

The present study provides valuable insights into the prescribing patterns of antidiabetic drugs among patients with Type 2 Diabetes Mellitus attending a district hospital and reflects real-world prescribing practices in a public healthcare setting. A major strength of the study is the systematic evaluation of prescriptions using WHO prescribing indicators, which enabled an objective assessment of rational drug use. The study also highlights the prevailing trends in antidiabetic drug utilization, prescribing practices, generic drug prescribing, and the burden of associated co-morbidities, thereby generating evidence that may help optimize diabetes management at the primary and secondary healthcare levels.

However, certain limitations should be considered while interpreting the findings. The study was conducted at a single centre with a relatively small sample size and over a limited study period, which may restrict the generalizability of the results to other healthcare settings and populations. Furthermore, the study focused primarily on prescription pattern

analysis and did not evaluate clinical outcomes such as glycaemic control, achievement of treatment targets, medication adherence, quality of life, adverse drug reactions, treatment costs, or long-term patient outcomes. The appropriateness of prescriptions with respect to guideline recommendations and the factors influencing prescribing decisions were also not assessed. Therefore, larger multicentric studies with longer follow-up periods incorporating clinical, economic, and patient-related outcomes are warranted to provide a more comprehensive evaluation of antidiabetic drug utilization and its impact on patient care.

CONCLUSION

The present study demonstrated that combination therapy, particularly metformin with glimepiride, was the most commonly prescribed antidiabetic regimen among patients with Type 2 Diabetes Mellitus in the district hospital setting. Hypertension was the most frequent associated co-morbidity, and polytherapy was commonly observed due to the presence of concomitant conditions. Prescribing practices showed adherence to rational drug use principles, with all medications prescribed by generic name and predominantly through the oral route. Regular prescription audits and drug utilization studies are essential to promote evidence-based, safe, and cost-effective management of diabetes mellitus.

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