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Original Research Article

Retrospective Study of Antidiabetic Medication Use in Type 2 Diabetes Patients at a Tertiary Healthcare Center

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Abstract:

Background: Type 2 diabetes mellitus is a growing public health challenge requiring long-term pharmacotherapy, and evaluating prescribing patterns helps assess the rational use of antidiabetic drugs. This study aimed to analyze the prescription pattern of antidiabetic medications among patients with type 2 diabetes mellitus attending a tertiary care hospital.

Methods: A hospital-based cross-sectional study was conducted over one year at a tertiary care hospital. A total of 166 patients with type 2 diabetes mellitus attending the diabetic outpatient clinic were included. Data on demographic characteristics, comorbidities, and prescribed antidiabetic drugs were collected from prescriptions and medical records. The data were analyzed using descriptive statistics with SPSS software.

Results: Most patients were aged 51–60 years (38.0%) and had a diabetes duration of 1–5 years (46.4%). Hypertension was the most common comorbidity (49.4%). The mean number of antidiabetic drugs per prescription was 2.9, with oral agents alone prescribed in 66.9% of patients. Metformin was the most commonly prescribed oral drug, while lispro mix insulin was the predominant injectable, and combination therapy was frequently used.

Conclusion: The study demonstrates a preference for metformin-based combination therapy in the management of type 2 diabetes mellitus, reflecting contemporary and rational prescribing practices.

Keywords: Type 2 diabetes mellitus; antidiabetic drugs; prescription pattern; drug utilization; tertiary care hospital.

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Introduction

Diabetes mellitus (DM) comprises a group of prevalent metabolic disorders unified by persistent hyperglycemia, arising from a complex interplay of genetic predisposition and environmental influences. These mechanisms result in impaired insulin secretion, reduced peripheral glucose utilization, and increased hepatic glucose production [1]. Sustained hyperglycemia is associated with progressive damage and dysfunction of multiple organs, particularly the eyes, kidneys, nerves, heart, and vasculature [2]. DM is broadly classified into type 1, type 2, gestational diabetes, and other specific forms, with type 2 diabetes mellitus (T2DM) accounting for the vast majority of cases, while type 1 diabetes mellitus constitutes only a small proportion [3].

Type 2 DM is characterized by varying degrees of insulin resistance, relative insulin deficiency, and increased endogenous glucose output. The global burden of T2DM has risen alarmingly over recent decades. The World Health Organization projected a dramatic rise in prevalence, with the number of affected individuals increasing several-fold by the early twenty-first century, alongside a substantial increase in overall prevalence rates [4]. Data from the International Diabetes Federation further highlight this trend, estimating hundreds of millions of individuals living with diabetes worldwide, with a particularly steep rise anticipated in developing countries, including India [5-7]. India bears a significant share of this burden, with projections indicating a continued increase in adult diabetes prevalence in the coming years [6, 7].

Achieving and maintaining optimal glycemic control remains the cornerstone of diabetes management, with contemporary strategies emphasizing prevention, early detection of high-risk individuals, and intensive intervention during the prediabetic stage. Pharmacological management primarily involves insulin and a wide range of oral

antidiabetic (OAD) agents, which differ in their mechanisms of action, safety, and tolerability profiles. These include insulin secretagogues, biguanides, α-glucosidase inhibitors, thiazolidinediones, incretin-based therapies such as DPP-4 inhibitors, and newer agents like sodium-glucose co-transporter-2 inhibitors [8-10]. Prescribing patterns reflect both clinician perspectives and healthcare system practices, making drug utilization studies essential for promoting rational, effective, and economical therapy [11]. Despite numerous studies on antidiabetic drug utilization in India and elsewhere [12-15], the absence of India-specific treatment guidelines and the high prevalence of comorbidities necessitate continuous evaluation of real-world prescribing practices. Hence, the present study was undertaken to assess the prescription pattern of antidiabetic drugs among T2DM patients attending a tertiary care hospital.

Materials and Methods

Study Design, Period, and Setting: This cross-sectional study was conducted over a period of one year at a tertiary care hospital, Medical College in collaboration with the Departments of Pharmacology and Endocrinology. Patients were recruited from the diabetic outpatient clinic of the hospital.

Study Population: A total of 166 patients diagnosed with type 2 diabetes mellitus and receiving antidiabetic therapy were included in the study. Patients of both sexes attending the diabetic clinic were eligible. Individuals with type 1 diabetes mellitus, gestational diabetes, or diabetes due to specific secondary causes were excluded.

Data Collection: Data were collected from outpatient prescriptions, medical records, and direct interviews with patients or their caregivers. Information regarding demographic characteristics, duration of diabetes, family history, prescribed antidiabetic medications, comorbid conditions, and concomitant drugs was documented using a structured case record form.

Statistical Analysis: All collected data were entered into a Microsoft Excel database and analyzed using SPSS statistical software. Variables were assessed for distribution, and data following normal distribution were expressed as mean and standard deviation.

Results

The majority of patients belonged to the 51–60 years age group (38.0%), followed by 41–50 years (30.7%), indicating a higher prevalence of type 2 diabetes in middle-aged and older adults. Most patients had a duration of diabetes between 1–5 years (46.4%), while 32.5% had diabetes for 6-10 years, suggesting a predominantly early to mid-stage disease population. Hypertension was the most common comorbidity (49.4%), followed by dyslipidemia (33.1%) and neuropathy (19.3%). The average number of antidiabetic drugs per prescription was 2.9, and the mean total number of drugs prescribed was 4.1. Oral antidiabetic therapy alone was prescribed in 66.9% of patients, whereas 30.1% received a combination of oral and injectable agents, and only 3.0% were treated exclusively with injectable antidiabetic drugs (Table 1).

Table 1: Demographic and Clinical Characteristics of the Study Population (n = 166)

Parameter	Category	Number of Patients (n)	Percentage (%)
Age (years)	≤30	7	4.2
	31–40	20	12.0
	41–50	51	30.7
	51–60	63	38.0
	61–70	23	13.9
	>70	2	1.2
Duration of Diabetes	<1 year	12	7.2
	1–5 years	77	46.4
	6–10 years	54	32.5
	>10 years	23	13.9
Comorbidities*	Hypertension	82	49.4
	Dyslipidemia	55	33.1
	Neuropathy	32	19.3
	CAD	14	8.4
	Hypothyroidism	8	4.8
Prescription Pattern	Oral antidiabetic drugs only	111	66.9
	Oral + Injectable therapy	50	30.1
	Injectable therapy only	5	3.0
Average drugs per prescription	Antidiabetic drugs	—	2.9
	Total drugs	—	4.1

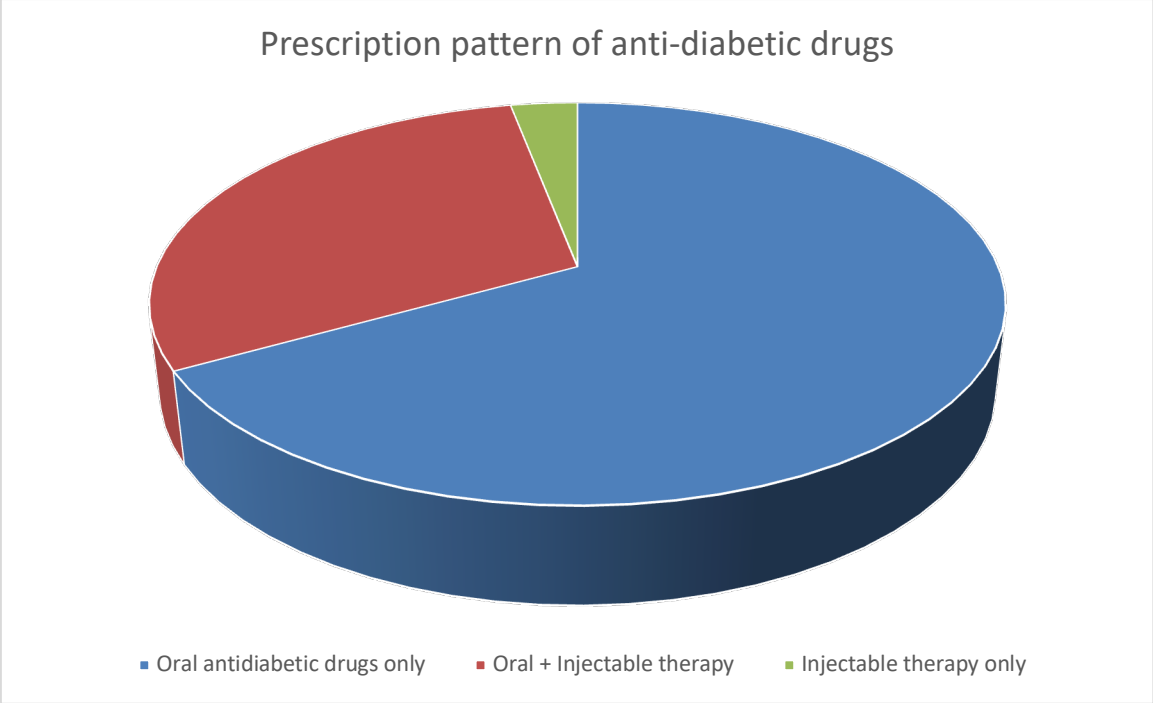

Figure 1: Prescription pattern of anti-diabetic drugs in the study population.

Metformin was the most commonly prescribed oral agent as monotherapy, used in 36.7% of patients, while lispro mix insulin was the predominant injectable monotherapy, prescribed to 41.0% of the study population. Among combination therapies, the two-drug regimen of metformin and glimepiride was the most frequently used (45.8%), highlighting its role as a preferred initial combination. As disease complexity increased, triple and quadruple drug combinations were also commonly prescribed, particularly regimens containing metformin, glimepiride, and pioglitazone with or without vildagliptin. A substantial proportion of patients received intensive multi-drug therapy, with five-drug (67.5%) and six-drug (66.9%) combinations, reflecting the need for aggressive glycemic control in patients with longer disease duration or inadequate response to simpler regimens (Table 2).

Table 4: Most Commonly Prescribed Antidiabetic Drugs in the Study Population (n = 166)

Drug Therapy (Mono/Combination)	Name of Drug(s)	Number of Patients (n)	Percentage (%)
Monotherapy – Oral	Metformin	61	36.7
Monotherapy – Injectable	Lispro mix insulin	68	41.0
Two-drug combination	Metformin + Glimepiride	76	45.8
Three-drug combination	Metformin + Glimepiride + Pioglitazone	46	27.7
Four-drug combination	Metformin + Glimepiride + Pioglitazone + Vildagliptin	43	25.9
Five-drug combination	Metformin + Glimepiride + Pioglitazone + Voglibose + Vildagliptin	112	67.5
Six-drug combination	Metformin + Glimepiride + Pioglitazone + Voglibose + Vildagliptin + Canagliflozin	111	66.9

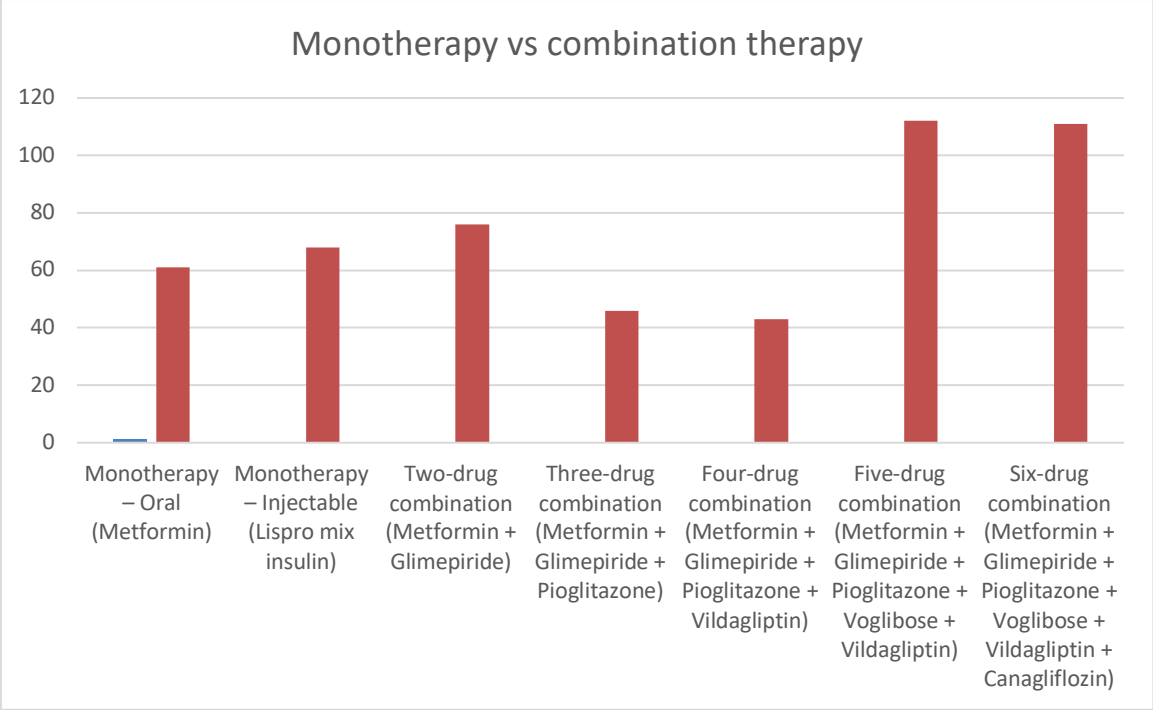

Figure 2: Patient distribution as per drug therapy (Mon/combination).

Discussion

In the present study involving 166 patients with type 2 diabetes mellitus, a higher proportion of patients belonged to the middle-aged and elderly population, with the maximum prevalence observed in the 51-60 years age group (38.0%). This finding is consistent with earlier studies reporting a similar age distribution [12, 16, 17]. The increased prevalence of diabetes with advancing age may be attributed to age-related decline in insulin secretion, progressive insulin resistance in peripheral tissues, and reduced insulin sensitivity associated with obesity and sedentary lifestyle [18, 19]. These factors collectively contribute to impaired glucose tolerance in older adults, making this age group particularly vulnerable to T2DM.

The average number of antidiabetic drugs prescribed per patient in this study was 2.9, reflecting a preference for combination therapy to achieve adequate glycemic control. This finding is lower than that reported by Upadhyay et al. and Karthikeyan et al. [12, 20], but higher than the observations of Kannan et al. [17]. Monotherapy was prescribed in a small proportion of patients, whereas the majority received combination therapy, ranging from two-drug to multi-drug regimens. This trend indicates the progressive nature of T2DM and the need for intensified pharmacotherapy when monotherapy fails to achieve glycemic targets. Variations in prescribing patterns across studies may be influenced by disease severity, duration of diabetes, and institutional treatment practices [21].

Among oral antidiabetic agents, metformin emerged as the most frequently prescribed drug, followed by glimepiride and pioglitazone, while lispro mix insulin was the most commonly used injectable preparation. These findings are in agreement with studies reporting widespread use of biguanides and sulfonylureas in routine clinical practice [22, 23]. Earlier studies from the late 1990s identified sulfonylureas as the most commonly prescribed agents [24, 25], whereas the current preference for metformin reflects evolving evidence favoring its efficacy, safety profile, and beneficial effects on weight and insulin resistance. Glimepiride remained the preferred sulfonylurea, particularly in combination with metformin, which is consistent with observations by Sudha et al. [22].

Comorbid conditions were commonly observed in the study population, with hypertension being the most prevalent (49.4%), followed by dyslipidemia, neuropathy, coronary artery disease, and hypothyroidism. Similar patterns of comorbidity have been reported in several Indian and international studies [22, 26, 27]. The coexistence of hypertension and diabetes is of particular clinical significance, as it markedly increases the risk of microvascular and macrovascular complications. Although cost is a major determinant of adherence in chronic diseases such as diabetes, the provision of free antidiabetic medications in this government tertiary care hospital likely contributed to improved access and continuity of therapy, potentially minimizing cost-related nonadherence in the study population.

Conclusion

The present study highlights the prevailing prescribing practices for the management of type 2 diabetes mellitus in a tertiary care hospital and demonstrates a predominant use of metformin-based combination therapy, reflecting adherence to current treatment principles. Combination therapy was commonly employed, indicating the progressive nature of the disease and the need for multiple agents to achieve optimal glycemic control, particularly in patients with longer disease duration and associated comorbidities such as hypertension and dyslipidemia. The preference for oral antidiabetic drugs, with limited use of injectable therapy, suggests an effort toward patient-friendly and cost-effective management. Overall, the prescribing pattern observed in this study indicates rational and evidence-based pharmacotherapy, though periodic prescription audits are essential to further optimize treatment outcomes and promote rational drug use.

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