

Analysis of Drug Utilization Patterns among Patients of Diabetes Mellitus: An Institutional Based Study

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ABSTRACT

Background: Current guidelines emphasize individualized management, incorporating lifestyle changes, pharmacological therapy, and early intervention in prediabetes to delay progression to type 2 diabetes. Since hypoglycemia remains the most frequent adverse effect of therapy, this study was undertaken to analyze drug utilization patterns among patients of diabetes mellitus.

Materials & Methods: This study analyzed prescribing trends in 100 type 2 diabetes mellitus patients (35–65 years), using WHO prescribing indicators. Data from prescriptions and interviews were evaluated with SPSS, focusing on drug utilization patterns and guideline adherence.

Results: The mean patient age was 53.9 years, with males forming the majority and a mean diabetes duration of 11.3 years. Metformin (83%) and sulfonylureas (61%) were the most prescribed drugs, with 1000 mg metformin and glimepiride being the preferred choices. Combination therapy dominated, especially two-drug regimens (59%), while monotherapy (10%) and four-drug regimens (3%) were less frequent.

Conclusion: The study revealed metformin as the most prescribed antidiabetic drug, though still underutilized, with a trend toward two-drug combination therapy and limited use of newer agents.

KEYWORDS: Diabetes, Drug, Metformin, Sulfonylureas.

INTRODUCTION

Dengue Diabetes mellitus currently affects more than 300 million individuals worldwide and remains a leading cause of morbidity and mortality across populations. With the rapid rise in both incidence and prevalence, it has become a major global health challenge, often described as a “metabolic tsunami.” This surge underscores the urgent need to unravel the underlying biological mechanisms that link obesity and diabetes, since both conditions often coexist and synergistically accelerate disease progression.^{1, 2} A deeper understanding of these pathophysiological pathways will not only enhance our ability to develop effective preventive interventions but also improve therapeutic outcomes. Equally important is the creation of public health strategies that promote healthier lifestyles and environments, aiming to mitigate the escalating burden of this disease.³

Recent advancements in clinical guidelines issued by the American Diabetes Association (ADA), the European Association for the Study of Diabetes (EASD), and The Endocrine Society emphasize the importance of

individualized treatment approaches. These recommendations highlight the need to tailor therapeutic regimens based on patient-specific factors such as comorbidities, risk of complications, and treatment goals in both outpatient and inpatient settings.¹ Furthermore, emerging evidence suggests that interventions targeting individuals with prediabetes to restore normoglycemia can significantly reduce or delay the progression to type 2 diabetes mellitus (T2DM). Such findings highlight the potential of early lifestyle modifications, pharmacological therapies, and structured clinical monitoring in altering the natural history of the disease, offering a valuable window of opportunity to curb its long-term impact.^{4, 5} The management of diabetes mellitus necessitates a combination of pharmacological and non-pharmacological strategies. Among the adverse drug reactions linked to antidiabetic therapy, hypoglycemia is the most frequent and is associated with significant morbidity and mortality.⁶ Hence; the present study was conducted to analyze drug utilization patterns among patients of diabetes mellitus.

MATERIALS & METHODS

The primary aim of the present investigation was to analyze drug utilization patterns in a diabetes outpatient setting, with emphasis on the quantification of antidiabetic agents prescribed per encounter and evaluation of adherence to recognized therapeutic guidelines. Individuals diagnosed with type 2 diabetes mellitus, aged 35–65 years, attending the diabetes clinic were included. Patients with type 1 diabetes mellitus, onset of diabetes below 35 years, and gestational diabetes mellitus were excluded. Data were systematically collected from outpatient prescriptions supplemented by structured interviews, using a predesigned case record form. A total of 100 prescriptions were randomly analysed to assess prescribing trends in type 2 diabetes mellitus patients, employing WHO prescribing indicators. All the results were recorded and evaluated using SPSS software. Univariate analysis was done for evaluation of level of significance.

RESULTS

Mean age of the patients was 53.9 years. Majority proportion of patients were males. Mean duration of diabetes was 11.3 years. Metformin was the most frequently prescribed agent (83%), followed by

sulfonylureas (61%). Other classes such as thiazolidinediones (26%), insulin (22%), DPP4 inhibitors (21%), and acarbose (21%) were used less frequently. This indicates a strong preference for metformin and sulfonylureas as the cornerstone of pharmacotherapy in type 2 diabetes mellitus. Within metformin prescriptions, the most commonly used dosage was 1000 mg (49.40%), followed by 500 mg (31.33%). Higher doses such as 1500 mg (9.64%) and 2000 mg (7.23%) were less frequently utilized, while 850 mg was prescribed rarely (2.41%). This demonstrates that standard therapeutic dosing (500–1000 mg) constituted the majority of prescriptions. Among sulfonylureas, glimepiride was predominantly prescribed (81.97%), with glipizide accounting for 14.75% and gliclazide for only 3.28%. This trend highlights glimepiride as the preferred sulfonylurea in clinical practice, likely due to its efficacy and favorable pharmacokinetic profile. Most patients received combination therapy, with 2-drug regimens being the most common (59%), followed by 3-drug regimens (28%). Monotherapy was prescribed in only 10% of cases, while 4-drug combinations were rarely used (3%). This indicates that polytherapy, particularly dual combinations, forms the mainstay of diabetes management in the study population.

Table 1: Distribution of Antidiabetic Drugs Prescribed

Drug Class	Number	Percentage
DPP4 Inhibitors	21	21
Acarbose	21	21
Insulin	22	22
Thiazolidinediones	26	26
Sulfonylureas	61	61
Metformin	83	83

Table 2: Distribution of Metformin Dosages Prescribed

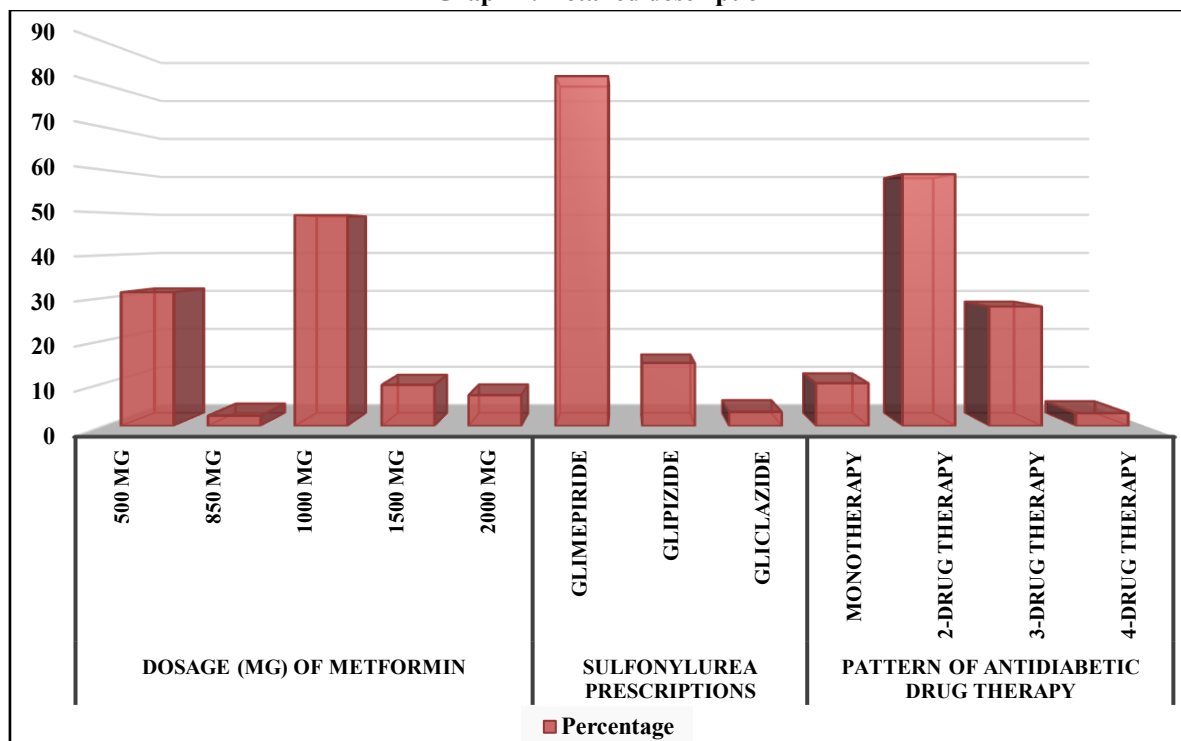
Dosage (mg)	Number	Percentage
500 mg	26	31.33
850 mg	2	2.41
1000 mg	41	49.40
1500 mg	8	9.64
2000 mg	6	7.23

Table 3: Distribution of Sulfonylurea Prescriptions

Drug	Number	Percentage
Glimepiride	50	81.97
Glipizide	9	14.75
Gliclazide	2	3.28

Table 4: Pattern of Antidiabetic Drug Therapy

Therapy Type	Number	Percentage
Monotherapy	10	10
2-drug therapy	59	59
3-drug therapy	28	28
4-drug therapy	3	3

Graph 1: Detailed description

DISCUSSION

Over the past two centuries, substantial progress has been achieved in elucidating the mechanisms regulating glucose homeostasis. In the mid-19th century, Claude Bernard demonstrated that glycaemic control is governed not only by dietary carbohydrate absorption but also by hepatic glucose production from nonglucose substrates. Subsequent research identified key enzymes mediating glycogen synthesis and degradation, the influence of anterior pituitary hormones on carbohydrate metabolism and diabetes pathogenesis, the role of reversible protein phosphorylation via protein kinases, and the discovery of cyclic AMP as a critical second messenger. These findings established the importance of epinephrine and glucagon in promoting hyperglycemia through enhanced glucose mobilization, thereby linking hormonal regulation to diabetic dysregulation. Drug utilization review integrated with disease management shifts the emphasis from solely identifying drug-related issues to a broader strategy that incorporates clinical guidelines and therapeutic algorithms to assess the suitability of pharmacotherapy for specific conditions. This approach necessitates evaluation of both clinical outcomes and pharmacoeconomic implications.⁷⁻¹⁰

Hence; the present study was conducted to analyze drug utilization patterns among patients of diabetes mellitus.

In the present study, the mean patient age was 53.9 years, with males forming the majority and a mean diabetes duration of 11.3 years. Metformin (83%) and sulfonylureas (61%) were the most prescribed drugs, with 1000 mg metformin and glimepiride being the preferred choices. Combination therapy dominated, especially two-drug regimens (59%), while monotherapy (10%) and four-drug regimens (3%) were less frequent. Abdi SA et al. conducted a prospective observational study in a tertiary hospital to assess antihyperglycemic drug utilization, costs, and ADRs in 350 diabetic inpatients. Insulin was the predominant therapy during hospitalization (81%), but its use declined significantly to 52% at discharge ($P < 0.05$), mainly due to a shift toward oral agents. The most common oral therapies were glimepiride with metformin during admission and metformin monotherapy at discharge. Total consumption was 13.42 DDD/100 bed-days, with 50 ADRs reported, all presenting as hypoglycemia.¹¹ Das P et al. evaluated demographics, prescribing trends, cost, and therapeutic effectiveness in diabetes management at a tertiary center. Among 282 prescriptions analyzed, the mean number of

drugs per prescription was 1.83 ± 1.31 , with oral hypoglycaemics prescribed to 64% of patients, predominantly biguanides (24.5%) and sulfonylureas (19.9%). Out of 67 patients followed for three months, 46 achieved glycaemic control, with biguanide monotherapy ($p=0.002$) and biguanide-sulfonylurea combination therapy ($p=0.005$) showing the highest efficacy; nearly 90% of patients on combination therapy attained control. The study highlights biguanides, alone or in combination, as highly effective regimens, while emphasizing the need for larger studies to strengthen evidence and optimize treatment practices.¹² Acharya KG et al conducted a prospective observational study over five months to evaluate prescription patterns, drug costs, and adherence to ICMR-2005 guidelines among diabetic patients in a tertiary care hospital. A total of 250 patients (mean age 57.91 ± 9.37 years; 50.4% male) were enrolled, with 1,391 drugs prescribed, averaging 5.56 ± 2.52 drugs per patient. Antidiabetic agents accounted for 539 prescriptions (mean 2.18 ± 0.96), where metformin was the most frequent monotherapy (40.45%), and the glimepiride-metformin combination was the most common dual therapy (76.28%). Aspirin (18.9%) and atorvastatin (15.41%) were the most frequent non-antidiabetic drugs. The mean monthly therapy cost was 354.60 ± 305.72 INR, and 83.6% of prescriptions adhered to standard guidelines. The study concluded that metformin remains the cornerstone of therapy in diabetic patients.¹³

CONCLUSION

The study revealed metformin as the most prescribed antidiabetic drug, though still underutilized, with a trend toward two-drug combination therapy and limited use of newer agents. Prescriptions were largely rational and guideline-compliant, but better metformin use and improved patient education on dosage are needed.

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