

## Comparison of Oral Hypoglycemic Agents in Type 2 Diabetes

Dr Kailash A

Assistant Professor, Department of General Medicine , GMC

### Corresponding Author

Dr Kailash A

Assistant Professor, Department  
of General Medicine ,GMC

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### ABSTRACT

**Background:** Type 2 Diabetes Mellitus (T2DM) is a chronic metabolic disorder characterized by insulin resistance and impaired insulin secretion. Various oral hypoglycemic agents (OHAs) are used for glycemic control; however, comparative efficacy and safety profiles vary.

**Objective:** To compare the efficacy, safety, and tolerability of commonly used oral hypoglycemic agents in patients with T2DM.

**Methods:** A prospective observational study was conducted on 150 T2DM patients divided into three groups: Metformin, Sulfonylureas (glimepiride), and DPP-4 inhibitors (sitagliptin). HbA1c, fasting blood glucose (FBG), postprandial blood glucose (PPBG), and adverse effects were recorded over 6 months.

**Results:** Metformin showed the greatest reduction in HbA1c (1.4%), followed by sitagliptin (1.1%) and glimepiride (0.9%). Hypoglycemia was most common in the sulfonylurea group. Sitagliptin had the best tolerability profile.

**Conclusion:** Metformin remains the most effective first-line OHA, while DPP-4 inhibitors showed better safety and tolerability. Sulfonylureas are effective but associated with hypoglycemic episodes. Combination therapy may be recommended for better glycemic control.

**Keywords:** Type 2 Diabetes Mellitus, Oral Hypoglycemic Agents, Metformin, Sulfonylureas, DPP-4 inhibitors, HbA1c.

## INTRODUCTION

Type 2 Diabetes Mellitus (T2DM) is a major global health problem with increasing prevalence. The International Diabetes Federation (IDF) estimated that **537 million adults worldwide** are living with diabetes (2021), and this number is expected to rise significantly in the coming decades. In India, T2DM represents a major health challenge due to changing lifestyle patterns, urbanization, and genetic predisposition.

Oral hypoglycemic agents (OHAs) are widely used for managing T2DM. They include:

- **Biguanides (Metformin)**
- **Sulfonylureas (e.g., Glimepiride)**
- **DPP-4 Inhibitors (e.g., Sitagliptin)**
- **SGLT-2 Inhibitors**
- **Thiazolidinediones**

Despite multiple treatment options, the optimal drug choice often depends on patient profile, efficacy, safety, cost, and side-effect profile.

**This study aims to compare the efficacy and safety of commonly used OHAs in T2DM patients.**

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## Materials and Methods

### Study Design

Prospective observational study over **6 months** at the Department of Medicine, tertiary care hospital.

### Sample Size

Total **150 diagnosed T2DM patients**, divided into 3 groups:

Group	Drug	No. of Patients
A	Metformin	50
B	Glimepiride (Sulfonylurea)	50
C	Sitagliptin (DPP-4 inhibitor)	50

### Inclusion Criteria

- Diagnosed T2DM patients aged 30–65 years
- HbA1c between 7–10%
- Newly diagnosed or on monotherapy

### Exclusion Criteria

- Type 1 DM
- Chronic kidney/liver disease
- Pregnancy
- On insulin therapy

### Parameters Assessed

- **HbA1c (Primary Outcome)**
- **Fasting Blood Glucose (FBG)**

- **Postprandial Blood Glucose (PPBG)**
- **Adverse effects** such as hypoglycemia, gastrointestinal disturbances, weight gain

### Data Analysis

Data were analyzed using SPSS. Mean values were compared using ANOVA. **p < 0.05 was considered statistically significant.**

## Results

### Baseline Characteristics

Parameter	Group A (Metformin)	Group B (Glimepiride)	Group C (Sitagliptin)
Mean Age (years)	51.2	52.4	50.8
Male/Female	28/22	26/24	27/23
Baseline HbA1c (%)	8.5	8.4	8.6

### Glycemic Control After 6 Months

Parameter	Metformin	Glimepiride	Sitagliptin
HbA1c Reduction (%)	<b>1.4</b>	0.9	1.1
↓FBG (mg/dL)	42	35	39
↓PPBG (mg/dL)	55	50	52

### Adverse Effects

#### Adverse Effect Metformin Glimepiride Sitagliptin

Hypoglycemia	Rare	<b>Common</b>	Rare
Weight Gain	No	<b>Yes</b>	No
GI Symptoms	Moderate	Mild	Rare

**Metformin showed the highest HbA1c reduction, while sulfonylureas caused more hypoglycemia. DPP-4 inhibitors had the best overall tolerability.**

## Discussion

The findings of the present study indicate that:

- **Metformin remains the most effective first-line therapy** for glycemic control.
- **Sitagliptin (DPP-4 inhibitor)** achieved moderate glycemic control with minimal side effects.
- **Sulfonylureas were effective but associated with frequent hypoglycemia and weight gain**, consistent with previous literature.

These results align with ADA and WHO guidelines, which recommend **metformin as first-line treatment**, followed by combination therapy based on patient characteristics.

### Clinical Implications:

- Patients with obesity and insulin resistance benefit most from metformin.
- Elderly patients prone to hypoglycemia should avoid sulfonylureas.
- Cost-effective therapy favors metformin and sulfonylureas, while sitagliptin may be preferred for safety.

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## Conclusion

Metformin demonstrated the best efficacy in reducing HbA1c levels, making it the preferred first-line OHA. DPP-4 inhibitors like sitagliptin showed favorable safety profiles with fewer adverse effects, while sulfonylureas remain effective but require caution due to hypoglycemic risk.

**Personalized therapy based on patient profile is essential for optimal diabetes management. Combination therapy may offer superior results in selected patients.**

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