



## RESEARCH ARTICLE

## Comparison of insulin vs oral hypoglycaemia agents on glycaemic control in type 2 diabetes: A retrospective study

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### ABSTRACT

**Background:** Type 2 Diabetes Mellitus is a chronic metabolic condition that requires precise glucose control to avoid complications. Insulin therapy and oral hypoglycaemic drugs (OHAs) are both commonly utilized, although their relative efficacy is still important in clinical practice.

**Objectives:** To assess the efficacy of insulin against oral hypoglycaemic medications for glycaemic control in Type 2 Diabetes Mellitus patients over a 12-month period.

**Methods:** This retrospective analysis comprised 145 participants with type 2 diabetes. The patients were divided into two groups: insulin therapy (n=70) and oral hypoglycaemic medicines (n=75). Data on HbA1c, FBS, and PPBS were gathered. Statistical analysis was conducted using t-tests and chi-square tests, with p-values <0.05 considered significant.

**Results:** Patients on insulin therapy had much better glycaemic control than those taking oral medications. The insulin group had decreased mean HbA1c levels (7.5 vs 8.2, p=0.01). FBS and PPBS levels were considerably lower in the insulin group (p<0.05). A greater number of patients achieved satisfactory glycaemic control with insulin (65% vs 45%, p=0.02). However, hypoglycaemia occurred more frequently in the insulin group (20% versus 10%, p=0.04).

**Conclusion:** Insulin therapy offers better glycaemic control than oral hypoglycaemic medications, but it is associated with a higher risk of hypoglycaemia. Individualized treatment strategies are critical for balancing efficacy and safety.

**Keywords:** Glycaemic control, hypoglycaemia, insulin therapy, oral hypoglycaemic drugs, PPBS

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### INTRODUCTION

Type 2 Diabetes Mellitus is a progressive metabolic condition marked by insulin resistance and decreased insulin production. Achieving optimum glycaemic control is critical for avoiding long-term consequences such as cardiovascular disease, neuropathy, nephropathy, and retinopathy(1). T2DM is managed with lifestyle changes as well as pharmaceutical therapy, which includes oral hypoglycaemic agents (OHAs) and insulin. OHAs, including metformin, sulfonylureas, and DPP-4 inhibitors, are commonly utilized as first-line or combination therapies. However, as the condition advances, many patients require insulin therapy to maintain proper glycaemic control(2).

Insulin therapy is seen to be the most effective treatment for lowering blood glucose levels, especially in people with long-term diabetes or poor control with oral medications. However, its use is frequently limited due to concerns about hypoglycaemia, weight gain, and the necessity for injections. On the other hand, OHAs are easier to give and have higher patient compliance, but they may be insufficient in cases of advanced disease(3).

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Comparing the efficacy of insulin and OHAs is critical for making informed treatment decisions and improving

patient outcomes. While various studies have assessed these medicines, real-world data from retrospective studies might provide useful insights into their practical efficacy. This study compares the glycaemic control achieved with insulin with oral hypoglycaemic medications in T2DM patients over a 12-month period, with an emphasis on clinical outcomes and safety profiles(4).

## METHODS

### Study Design

Retrospective observational study conducted over 12 months.

### Study Population

- Total patients: 145
- Insulin group: 70
- Oral hypoglycaemic agents group: 75

### Inclusion Criteria

- Diagnosed T2DM
- Age  $\geq 30$  years
- On treatment for at least 6 months

### Exclusion Criteria

- Type 1 diabetes
- Gestational diabetes
- Severe comorbid illness

### Data Collection

- HbA1c
- Fasting Blood Sugar (FBS)
- Postprandial Blood Sugar (PPBS)
- Hypoglycaemic events
- Hospitalization

### Statistical Analysis

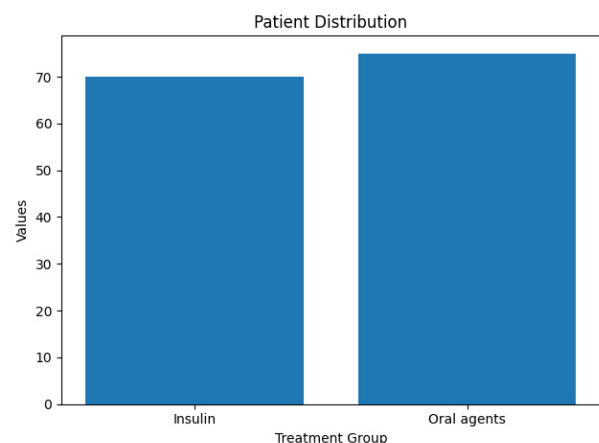
Data analysed using t-test and chi-square test.  $p < 0.05$  considered significant.

## RESULTS

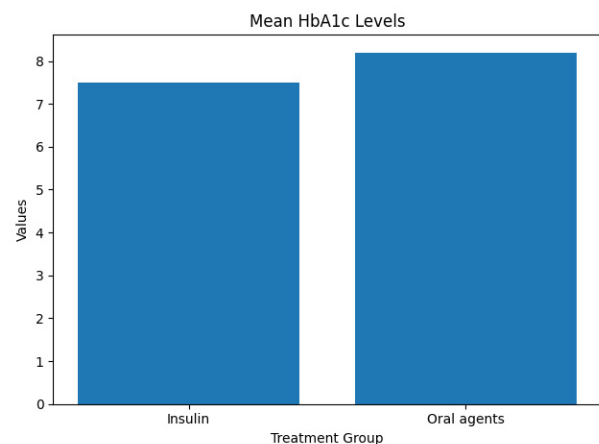
### DISCUSSION

This retrospective analysis shows that insulin therapy outperforms oral hypoglycaemic medications in terms of glycaemic control in patients with Type 2 Diabetes Mellitus. The study found that individuals receiving insulin therapy had significantly decreased HbA1c, fasting blood glucose, and postprandial blood glucose levels(5).

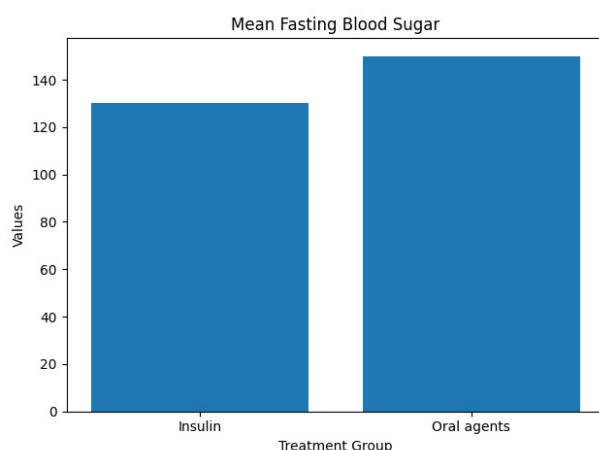
The insulin group demonstrated better glycaemic control,



**Figure 1:** Patients distribution



**Figure 2:** Mean HbA1c levels



**Figure 3:** Mean fasting blood sugar

**Table 1:** Baseline Characteristics

| Variable            | Insulin    | Oral agents | p-value |
|---------------------|------------|-------------|---------|
| Age (Mean $\pm$ SD) | 56 $\pm$ 9 | 54 $\pm$ 10 | 0.21    |
| Male (%)            | 62%        | 60%         | 0.78    |
| BMI (Mean $\pm$ SD) | 29 $\pm$ 4 | 28 $\pm$ 3  | 0.32    |

**Table 2:** Glycaemic Parameters

| Parameter | Insulin | Oral agents | p-value |
|-----------|---------|-------------|---------|
| HbA1c     | 7.5     | 8.2         | 0.01    |
| FBS       | 130     | 150         | 0.02    |
| PPBS      | 180     | 210         | 0.03    |

**Table 3:** Clinical Outcomes

| Outcome         | Insulin (%) | Oral agents (%) | p-value |
|-----------------|-------------|-----------------|---------|
| Good control    | 65          | 45              | 0.02    |
| Hypoglycaemia   | 20          | 10              | 0.04    |
| Hospitalization | 10          | 15              | 0.30    |

which is consistent with insulin's pharmacological method of directly lowering blood glucose levels by increasing cellular glucose uptake and decreasing hepatic glucose synthesis(6). Oral hypoglycaemic medications, on the other hand, rely on residual pancreatic beta-cell function or insulin sensitivity, which may deteriorate with time in people with long-term diabetes(7).

When compared to those using oral medications, a significantly larger proportion of insulin-treated individuals had satisfactory glycaemic control. This emphasizes the need of initiating insulin therapy on time in patients who do not obtain appropriate control with oral medicines. However, insulin therapy was linked to an increased risk of hypoglycaemia. This is a well-known side effect that remains a significant obstacle to insulin use. Careful dose titration, patient education, and regular monitoring are needed to reduce this risk(8).

Interestingly, there was no significant difference in hospitalization rates between the two groups, implying that while insulin improves glycaemic control, it may not necessarily lower short-term healthcare consumption. Baseline parameters such as age, gender, and BMI were similar between groups, indicating that the observed variations in outcomes are most likely due to treatment effects rather than confounding factors(9).

The study contains drawbacks, including a retrospective

design and a lack of randomization, which may result in selection bias. Furthermore, variables such as diabetes duration, adherence to therapy, and lifestyle changes were not completely accounted for. Despite these limitations, the study provides important real-world evidence for the efficacy of insulin therapy in improving glycaemic control. Clinicians should consider initiating insulin therapy early in appropriate individuals while considering the risk of hypoglycaemia(10).

## CONCLUSION

Insulin therapy is more successful than oral hypoglycaemic medications for attaining glycaemic control in Type 2 Diabetes Mellitus patients. Patients who received insulin had considerably lower HbA1c and blood glucose levels, as well as a higher rate of glycaemic control. However, insulin use was linked to an increased risk of hypoglycaemia. These findings emphasize the necessity of personalized treatment regimens, early insulin introduction where indicated, and close monitoring to improve outcomes while avoiding side effects. Effective diabetes management requires a balanced approach that takes into account patient characteristics, disease progression, and safety.

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