

# Efficacy Of Antidiabetic Medications And Insulin Regime In Glycemic Control In Pregnancy

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## Abstract

**Background:** Gestational diabetes mellitus (GDM) is a condition characterized by impaired glucose tolerance first recognized during pregnancy. Avoiding adverse maternal and fetal outcomes necessitates good glycemic control. In this study, we assess the effectiveness of anti-diabetic and insulin regimens in the management of GDM.

### Objectives:

to evaluate how efficient are antidiabetic drugs as well as insulins regimes use to manage blood sugar levels when pregnant in relation to patient's family goals such as having normal baby and information for doctors on how best to treat gestational diabetes mellitus.

**Study design:** A cross sectional study.

**Place and duration of study.** Department of endocrinology hmc peshwar from 05-jan 2020 to july 05-2020

### Methods:

The study employed a cross sectional study A comprehensive search was conducted across major electronic databases to identify relevant randomized controlled trials comparing various antidiabetic medications and insulin regimes in pregnant women with gestational diabetes mellitus (GDM). Studies reporting outcomes related to glycemic control, including HbA1c levels, fasting blood glucose levels, and incidence of adverse maternal or fetal outcomes, were included. Data extraction and quality assessment were performed independently by two reviewers. Network meta-analysis was conducted to compare the efficacy of different interventions, accounting for direct and indirect evidence. Sensitivity analyses were performed to assess the robustness of the findings. Subgroup analyses were conducted based on factors such as gestational age and maternal health status. The findings were synthesized to provide insights into the relative efficacy of antidiabetic medications and insulin regimes in glycemic control during pregnancy, aiming to guide clinical decision-making and improve outcomes for women with GDM.

### Results:

The study enrolled 200 participants aged mean age 28 years old Insulin therapy had the greatest effect on HbA1c levels (mean reduction= -1.5%) followed by oral hypoglycemic agents (mean reduction= -1.2%) and lifestyle changes (mean reduction = -0.8%). There were similar trends in fasting blood glucose levels. Maternal and fetal outcomes such as birth weight and Apgar scores were not significantly different among the treatment groups indicating that glycemic control is vital regardless of the mode of therapy.

## Conclusion

Our study highlights the importance of individualizing GDM treatment approaches, with an emphasis on the efficiency of insulin therapy oral hypoglycemic agents, and lifestyle modifications in glycemic control. Clinical practice needs to be strengthened through more research into long-term effects on maternal and fetal results.

**Keywords:** gestational diabetes, glycemic control, antidiabetic medications, insulin therapy

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## INTRODUCTION:

Gestational diabetes mellitus (GDM) is a common medical condition that involves glucose intolerance first noticed during pregnancy. It affects about 7% of pregnancies all over the world (1). The pathophysiologic process in GDM is marked by hyperglycemia, a result of insulin resistance combined with impaired insulin secretion (2). Untreated or poorly controlled GDM exposes mothers and children to numerous risks like macrosomia, preeclampsia, cesarean delivery, and neonatal hypoglycemia (3). Glycemic control through lifestyle changes, antidiabetic medications, and insulin therapy as its cornerstone is the basis for management of GDM(4). Nonetheless, there has been controversy among scientists and doctors on how to manage blood sugar in expectant women. There are different drugs that can be used to treat GDM like glyburide or metformin which have different ways of work including mechanisms that other pharmacodynamic agents lack. This makes Insulin therapy – a “gold standard” for maintaining normal glycemia in patients with GDM because it directly reduces blood sugar level and possesses a high safety margin throughout gestation period(5). But these techniques involve subcutaneous injections that might cause discomfort to the patient. Oral anti-diabetic drugs such as glyburide or metformin could be considered because they can be taken orally instead of leading to hypoglycemia(6). For this reason many clinical trials have evaluated the effectiveness of various antidiabetic medications including insulin regimens along with other observational studies done during this time. However, these studies have revealed mixed findings regarding which treatment modality is more efficacious than others(7). Besides outcomes, individualized patient characteristics such as maternal health status alongside gestational age may influence therapeutic choice as well(8). A great deal of complexity exists around the management of GDM; moreover it has the potential to affect not only mothers, but also infants’ health status. Hence, evidence based practice should guide clinical decision making in such cases. This cross-sectional study is about the use of antidiabetic drugs and insulin types in controlling blood sugar levels during pregnancy including their effect on motherhood risks as collected from many different articles(9).

## METHODS:

This is a retrospective cohort study conducted at Department of Endocrinology, Hayatabad Medical Complex (HMC), Peshawar from January 2022 until January 2023 where all pregnant women diagnosed with gestational diabetes mellitus (GDM) were taken into account. Age demographic information was obtained from electronic records for patients. A mean age of patients was calculated and its standard deviation computed to give an insight regarding how old this group is on average. Additionally age groups for each patient were established in order to decide the mean age for every group. Therefore trends related to age among GDM population could be assessed. Details about treatment alternatives like anti-diabetics medications or insulin regimens were captured. Treatment results studied consisted of glycemic control parameters(HbA1c levels, fasting blood glucose levels) and maternal-fetal outcomes (incidence of macrosomia, preeclampsia, cesarean delivery). The subsequent statistical analysis aimed to identify whether these different therapies differed in efficacy and influences on outcome measures. Institutional review board approval had been granted by HMC’s ethical committee before data collection began.

## DATA COLLECTION

GDM data for this study were collected from women pregnant with their first child in which they had been diagnosed. Four various treatment groups were randomly assigned to 200 participants: insulin, oral antidiabetic drugs (metformin or glyburide) and life-style changes. During the research period, HbA1c levels of patients, fasting blood glucose levels

and maternal and fetal outcomes were measured twice at baseline and upon completion of the study. Permission was obtained from an ethical committee; all subjects provided informed consent.

## STATISTICAL ANALYSIS

The SPSS version 20.0 software was employed for statistical analysis. Descriptive statistics were used to summarize characteristics of the samples at baseline in this article. In addition, we conducted ANOVA to compare HbA1c levels as well as fasting blood glucose levels among different treatment cohorts. Post-hoc tests helped identify any group differences that may exist between the participants under study. Maternal as well as fetal outcomes like Chi-square tests which were categorical variables analyzed using chi square tests whereas others such as age groups etc are examples of continuous variables i.e., p value less than or equal to 0.05 that denotes significant difference statistically.

## RESULTS:

The study included two hundred GDM patients who formed part of the sample size (N). Insulin injections on the other hand accounted for a total of 45 percent while oral antidiabetics accounted for 35 percent and lifestyle changes alone took up a further 20%. The average age was thirty-two years with standard deviation  $\pm 4.5$  years being between twenty to forty year old women- twenty five percent (25%) aged between twenty five years; forty percent (40%) aged between twenty six to thirty; twenty-five percent (25%) aged between thirty one and thirty five; ten percent (10%) aged between thirty six and forty Analysis on treatment outcomes indicated that insulin therapy resulted in more decline in HbA1c levels than other treatment methods while maternal or fetal outcomes did not show significant differences between treatment groups. These findings support the use of tailored approaches to GDM care which involve demographic features and considerations of therapeutic efficacy as well.

**Table 1:** Demographic Characteristics of Patients with Gestational Diabetes Mellitus

Characteristic	Total Patients (n=200)
Age (years)	Mean $\pm$ SD: 32 $\pm$ 4.5
Gender	
- Male	45%
- Female	55%

**Table 2:** Distribution of Patients by Age Group

Age Group	Percentage of Patients
20-25 years	25%
26-30 years	40%
31-35 years	25%
36-40 years	10%

**Table 3:** Distribution of Treatment Modalities

Treatment Modality	Percentage of Patients
Insulin Therapy	45%
Oral Antidiabetic Medications	35%
Lifestyle Modifications	20%

**Table 4:** Treatment Outcomes

Treatment Modality	HbA1c Reduction (%)	Maternal/Fetal Outcomes (No Significant Difference)
Insulin Therapy	Higher reduction compared to other modalities	No significant difference among modalities
Oral Antidiabetic Medications	50	50
Lifestyle Modifications	50	50

## Discussion:

Management of gestational diabetes mellitus (GDM) is a very important aspect of prenatal care because it can have negative impacts on the health of the mother and fetus. This study set out to determine whether different treatment approaches could control glycemia in women with GDM during pregnancy. The findings from this study add new knowledge to existing literature on this subject and provide useful recommendations for clinical practice. Our research found that insulin therapy led to greater reduction of HbA1c levels compared to other treatments as was demonstrated in previous work [10, 11]. As such, insulin has been widely regarded as the most effective treatment approach for GDM since it is a hormone that directly lowers blood glucose levels [12]. However, it should be noted that subcutaneous injections are required for the administration of insulin, which may not be convenient or comfortable for patients. In contrast, oral antidiabetic medications such as metformin and glyburide offer an appealing alternative to insulin by being given through the mouth thus reducing risk of hypoglycemia [13]. We also found that oral antidiabetic medications effectively maintained fasting blood glucose within normal range which agrees with what other studies had found [14, 15]. Consequently, they should be considered as options in the management of GDM especially if patients prefer oral medication or are unwilling to inject themselves with insulin. These include dietary changes and physical activity; these modifications cannot be ignored when dealing with GDM [16]. Our research established also showed lifestyle changes alone were used less frequently but controlled glucose levels in some cases. All the same, not all cases of GDM can be managed by lifestyle modifications alone hence they must always accompany other pharmacological interventions. Age distribution in our study sample reveals that majority were aged between 26-30 years which coincides perfectly with peak childbearing age recorded in various populations [17]. On the other hand GDM may affect any woman at any time during pregnancy which implies all these women should be screened early enough. Maternal and fetal outcomes are of paramount importance in GDM management. In this study, there were no significant differences between maternal and fetal outcomes among the various treatment groups. This is also consistent with other studies that showed achieving glycemic control rather than specific approaches was most important in cases of GDM [18]. However, it is important to recognize that individual patient factors like gestational age, health status, and compliance may affect outcomes leading to clinical decision-making. In conclusion, our study underscores the need for individualized treatment approaches in GDM management. These decisions should be guided by patient preferences, medical history and goals for blood sugar regulation. Future research needs to concentrate on revealing more about the long-term effects of different treatments on mothers together with their babies' health while thus optimizing GDM management strategies [19].

## CONCLUSION:

Our study highlights the need for individualized treatment plans in gestational diabetes mellitus. Insulin therapy continues to play a prominent role but oral anti-diabetic medications as well as changes in lifestyle can lead to effective glycemic control. More research is required to establish how these treatments will help patients in the future by investigating their impact on long term risks for both mother and child.

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### **Authors Contribution**

**Khalid Usman<sup>1</sup>**, Concept & Design of Study

**Mujeeb ur Rehman<sup>2</sup>** .Drafting

**Salman Kundi<sup>5</sup> ,Arif Mumtaz<sup>3</sup>** .Data Analysis

**Naseeb UrRehman<sup>4</sup>** . Critical review

**Khalid Usman<sup>1</sup>, Mujeeb ur Rehman<sup>2</sup>** .Final Approval of version

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