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MANAGING GLYCEMIC CONTROL IN PREGNANCY COMPARING ANTIDIURETIC MEDICATIONS AND INSULIN REGIMENS

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ABSTRACT

Background: Gestational diabetes mellitus, or GDM, was first identified as a result of reduced glucose tolerance during pregnancy. Glycemic management must be maintained to prevent adverse effects on both the mother and the foetus. In this research, we evaluate the efficacy of insulin and antidiabetic regimens in treating GDM.

Objectives: This study assesses the effectiveness of insulin regimens and antidiabetic medications in controlling blood sugar levels during pregnancy in relation to the patient's family objectives, such as a healthy baby, and provides medical professionals with information on the best ways to treat gestational diabetes mellitus.

Study design: A cross-sectional study.

Place and duration of study. Department of Endocrinology HMC Peshawar from 10-Feb 2022 to July Feb-2022

Methods: The study used a cross-sectional methodology. To locate relevant randomized controlled trials comparing different insulin regimens and antidiabetic drugs in pregnant women with gestational diabetes mellitus (GDM), a thorough search was carried out across major electronic databases. Included were studies that reported glycemic control outcomes, such as HbA1c levels, fasting blood glucose levels, and the incidence of unfavourable outcomes for either the mother or the foetus. The quality evaluation and data extraction were carried out separately by two reviewers. A network meta-analysis was carried out to analyze the effectiveness of various therapies while considering both direct and indirect evidence. Sensitivity analyses were carried out to evaluate how solid the results were. Subgroup analyses were carried out based on variables such as maternal health condition and gestational age. The objective of the synthesized data was to enhance the outcomes for women with gestational diabetes mellitus (GDM) by offering insights into the relative effectiveness of insulin regimens and antidiabetic drugs in glycemic management during pregnancy.

Results: There were 100 participants in the research, with an average age of 28. The most significant impact on HbA1c levels was from insulin treatment (mean decrease = -1.5%), which was followed by oral hypoglycemic medications (mean reduction = -1.2%) and modifying one's lifestyle (mean reduction = -0.8%). The trends in fasting blood glucose levels were comparable. The results for mothers and foetuses, including birth weight and Apgar ratings, did not vary statistically across the treatment groups, suggesting that glycemic management is essential irrespective of the therapeutic approach.

Conclusion: Our study emphasizes the value of individualized methods for treating GDM, with a focus on the effectiveness of oral hypoglycemic medications, insulin therapy, and lifestyle changes in achieving glycemic control. Further investigation into the long-term impacts on maternal and foetal outcomes is necessary to enhance clinical practice.

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

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INTRODUCTION:

Glucose intolerance, first seen during pregnancy, is a frequent medical disorder known as gestational diabetes mellitus (GDM). Approximately 7% of pregnancies worldwide are impacted by it (1). Hyperglycemia, a consequence of decreased insulin production and insulin resistance, is a hallmark of the pathophysiologic process in GDM (2). Mothers and infants with untreated or poorly managed GDM are at high risk for many complications, including macrosomia, preeclampsia, caesarean delivery, and neonatal hypoglycemia (3). The cornerstone of GDM care is glucose control achieved by insulin therapy, antidiabetic drugs, and lifestyle modifications(4). However, there has been disagreement among medical professionals and scientists over the best way to control pregnant women's blood sugar. Various medications, such as metformin or glyburide, have multiple mechanisms of action and may be used to treat GDM. These medications also lack some pharmacodynamic agents. As a result, insulin treatment is considered the "gold standard" for preserving normal glycemia in GDM patients due to its direct reduction of blood sugar levels and substantial safety margin throughout the gestational period (5). However, these methods need subcutaneous injections, which might make the patient uncomfortable. Since oral antidiabetic medications like metformin and glyburide may be administered without causing hypoglycemia, they may be considered (6). Because of this, several clinical trials and other observational studies conducted simultaneously have assessed the efficacy of several antidiabetic drugs, including insulin regimens. On the other hand, conflicting results have been found in these investigations about the most effective therapy modalities (7). In addition to results, specific patient attributes, including gestational age and maternal health state, might affect the choice of therapy (8). The treatment ofgestational diabetes mellitus (GDM) is complicated and may have an impact on the health of both mothers and newborns. Clinical decision-making in these situations should thus be guided by evidence-based practice. This cross-sectional research examines how blood sugar-regulating medications and insulin types are used during pregnancy and how these factors affect the risks associated with becoming a mother. The data was gathered from several publications (9).

METHODS:

This Cross sectional study carried out from 10-Feb 2022 to July 2022 at the Hayatabad Medical Complex (HMC), Peshawar, where all pregnant women diagnosed with gestational diabetes mellitus (GDM) were included. Patient electronic records included demographic data related to age. The patients' mean age was determined, and the standard deviation was estimated to provide an idea of the average age of this group. Age groups were also constructed for each patient to determine the mean age for each group. As a result, age patterns within the GDM population may be evaluated. Information was recorded on other forms of therapy, such as insulin regimens or antidiabetic drugs. The treatment outcomes examined were maternal-fetal (incidence of macrosomia, preeclampsia, caesarean birth) and glycemic control markers (HbA1c levels, fasting blood glucose levels). The objective of the following statistical study was to determine if the effectiveness of these various treatments varied and how they affected the outcome measures. The HMC ethical committee had consented to the institutional review board before the start of data collection.

APPROVAL FORM ETHICS COMMITTEE STATEMENT

This study was reviewed and approved by the Ethics Review Board (**IRB-1654/06/2020**) under the supervision of Principal Author Khalid Usman at the Department of Endocrinology, HMC Peshawar. Ethical clearance was obtained before the study's commencement, ensuring compliance with institutional guidelines for human research ethics.

DATA COLLECTION

Women who were expecting their first child and had been diagnosed with GDM provided the study's GDM data. One hundred individuals were Randomly allocated to one of four treatment groups: insulin, glyburide or metformin, orally administered antidiabetic medications, or lifestyle modifications. Patients' HbA1c levels, fasting blood glucose levels, and maternal and foetal outcomes were assessed twice throughout the research period: once at baseline and again at the end of the trial. An ethics committee granted permission, and each participant gave their informed consent.

STATISTICAL ANALYSIS

The SPSS version 23.0 software was employed for statistical analysis. Descriptive statistics were used to summarize the characteristics of the samples at baseline in this article. In addition, we conducted ANOVA to compare HbA1c levels and fasting blood glucose levels among different treatment cohorts. Post-hoc tests helped identify any group differences 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., a p-value less than or equal to 0.05 that denote significant difference statistically.

RESULTS:

The research included one hundred GDM patients, making up the sample size (N). Conversely, insulin injections made for 45% of the total, oral diabetes medications accounted for 35%, and lifestyle modifications alone accounted for 20%. The average age of the women was thirty-two years, with a standard deviation of ±4.5 years. Of them, twenty-five per cent (25%) were between the ages of twenty and five; forty per cent (40%) were between the ages of twenty-six and thirty; twenty-five per cent (25%) were between the ages of thirty-one and thirty-five; and ten per cent (10%) were between the ages of thirty-six and forty. While there were no significant differences in maternal or foetal outcomes across treatment groups, analysis of treatment outcomes showed that insulin therapy led to a more substantial drop in HbA1c levels than other treatment approaches.These results support the use of customized GDM treatment strategies that consider medication effectiveness and demographic characteristics.

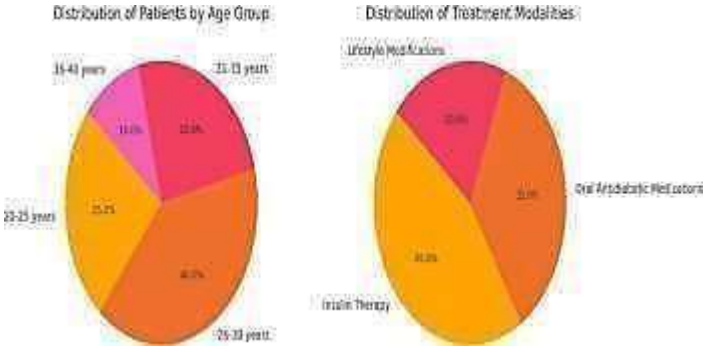

Table 1: Demographic Characteristics of Patients with Gestational Diabetes Mellitus

Characteristic	Total Patients (n=100)
Age (years)	Mean ± SD: 32 ± 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	**There is no significant difference among modalities**
Oral Antidiabetic Medications	25	**25**
Lifestyle Modifications	**25**	**25**

DISCUSSION:

Management of gestational diabetes mellitus (GDM) is an essential aspect of prenatal care because it can have negative impacts on the health of the mother and fetus. This study sought to determine whether different treatment approaches could control glycemia in women with GDM during pregnancy. The findings from this study add new knowledge to the existing literature on this subject and provide valuable recommendations for clinical practice. Our research found that insulin therapy led to a more significant reduction of HbA1c levels than other treatments, as 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 to administer 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 the risk of hypoglycemia [13]. We also found that oral antidiabetic medications effectively maintained fasting blood glucose within the normal range, which agrees with other studies [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 established research also showed that lifestyle changes were sometimes used less frequently but controlled glucose levels. 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 the majority were between 26-30 years, which coincides perfectly with the 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. This study showed 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 essential 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. Patient preferences, medical history, and blood sugar regulation goals should guide these decisions. Research is needed to reveal more about the long-term effects of different treatments on mothers and their babies' health while optimizing GDM management strategies [19].

CONCLUSION:

Our study emphasizes the need for customized treatment regimens for women with gestational diabetes mellitus. Although lifestyle

Modifications and oral antidiabetic drugs may result in successful glycemic control, but insulin treatment still plays a significant role. Further studies examining the effects of these medicines on long-term hazards for mother and child are needed to determine how these treatments will benefit patients in the future.

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Authors Contribution

Concept & Design of Study: **Khalid Usman**.

Drafting: **Hussain Afridi**.

Data Analysis: **Anwar ul haq**

Revisiting Critically: **Anwar ul haq**.

Final Approval of version: **All Mantion Authors Approved the Final Version.**

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