

## A Prospective Study of Glucose Control with Diet in Women with Gestational Diabetes Mellitus

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### ABSTRACT

**INTRODUCTION:** It is important to identify modifiable factors that may lower gestational diabetes mellitus (GDM) risk. Dietary iron is of particular interest given that iron is a strong prooxidant, and high body iron levels can damage pancreatic  $\beta$ -cell function and impair glucose metabolism. The current study is to determine if prepregnancy dietary and supplemental iron intakes are associated with the risk of GDM.

**MATERIALS AND METHODS:** Study was done in Obstetrics and Gynecology department, MGM Medical College, Jamshedpur. Study duration was 1 years. It was a prospective study comprising of patients who came with raised blood glucose levels on their 1st visit.

**RESULTS:** Prevalence of GDM (2.87%) is observed to be comparable to various other centers. Highest number of GDM cases was observed in age group of 26-30 years (62.96%). Control of glycemia with diet could be achieved in majority of women (53.85%) at 3 months post-partum as reflected by FBS levels. Incidence of Macrosomia (29.63%) and LSCS (77.78%) could not be lessened by glyceimic control with diet in women with GDM.

**CONCLUSION:** Prevalence of GDM was comparable to that of other studies. Rate of caesarean section was very high and main indications being foetal distress and cephalopelvic disproportion. Maternal and perinatal morbidity increases as duration of GDM increases. Control of glycemia with dietary treatment can help reduce occurrence of complications in mother and baby. It requires proper compliance, absence of which calls for need of insulin in most of patients with uncontrolled glycemia since first.

**KEY WORDS:** gestational diabetes mellitus, Macrosomia, LSCS.

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### I. Introduction:

Gestational diabetes mellitus (GDM) is one of the most common pregnancy complications affecting approximately 7% of all pregnancies and up to 14% of pregnancies in high-risk populations.<sup>1</sup> Overweight and obesity are the major modifiable risk factors of GDM. However, the overall population attributable fraction among the general U.S. population because of overweight and obesity is estimated to be less than 50%, implying the need to identify additional risk factors, particularly modifiable risk factors, that may help lower GDM risk.

All pregnant women need to eat well balanced diet. Such diet at proper time can keep blood sugar levels from becoming too high or too low and achieving glyceimic control. It can also help women to avoid the need for insulin to control their blood sugar and thus reducing the costs of treatment of GDM. Dietary glyceimic control is defined as a part of comprehensive treatment of GDM and diets low in carbohydrates, lipids and proteins have demonstrated to reduce hyperglycemia compared with diets high in carbohydrates alone. Adhesion to dietary treatment is difficult in most patients when they intake lower amount of carbohydrates. The findings reported in control of GDM such as changes in weight gain, energy intake and macronutrients are a part of basic treatment to prevent complications for the foetus and mother.

In present study, outcome is studied whether the nonpharmacological method of glyceimic control with dietary treatment alone in women with GDM are really helpful or not.

Objective of present research was to study the effect of diet in achieving glyceimic control in women with GDM, to study neonatal outcome in women with GDM treated with diet, to study maternal outcome in women with GDM treated with dietary modification.

### II. Materials And Methods:

This Study was conducted in Obstetrics and Gynecology department, MGM Medical College, Jamshedpur from March 2017 to February 2018. Study duration was 1 years.

**Inclusion criteria:**

- ✓ All pregnant women once reported with random sugar level >140 mg/dl.
- ✓ History of GDM in previous pregnancy/pregnancies.

**Exclusion criteria:**

- ✓ History of Overt Diabetes Mellitus
- ✓ Presence of morbid obesity (BMI >30 kg/m<sup>2</sup>) or hypertension.

This is a prospective study comprising of patients who had their random blood sugar levels raised above the decided level. Sample size was 50 patients in duration of 1 years starting from March 2017 to February 2018.

Patients were studied in a row after screening inclusion and exclusion criteria and management of GDM was started with diet therapy in them. Obese women were not included in study because prevalence of obesity is less in rural area where study was performed. Also, obesity may make diagnosis of pure GDM difficult as many of obese women may be overt diabetic already before pregnancy.

All women were assessed according to their body weight and preliminary blood sugar values. Thereafter they were followed-up regularly and the outcome of diet therapy in management of GDM was assessed.

**III. Results:**

H/O treatment taken	Glycemia improved		Significance
	YES	NO	
	Frequency	%	Frequency %
Yes	10	30.32	13 16.76
No	-	-	27 69.56
total	10	20.65	40 83.29

Chi square: 7.82  
D.f.2  
P=0.06

**Table 1: Treatment taken for diabetes and improvement of glycemia.**

Risk factors	Frequency	Percentage
None	7	24.66
Maternal age greater than 25	15	51.37
Poor pregnancy outcome in past	10	35.67
Glycosuria	23	86.45
Family history of diabetes	17	60.56
Gestational hypertension	5	15.78

**Table 2: Existing risk factors (Factors favouring GDM).**

Glycemia improved	In patient (N=27)		In patient (N=23)		Total (N=50)		Test of significance
	Frequency	%	Frequency	%	Frequency	%	
Diet alone (n: 23)	18	28	15	30	33	66	Chi square =4.32 D.f. 2 P = 0.06
Insulin required (n: 27)	9	18	8	16	17	34	
Total (n: 50)	27	46	23	46	50	100	

**Table 3: Glycemic improvement with type of management.**

Neonatal morbidity	Frequency	Percentage
hyperbilirubinemia	7	19.45
hypoglycemia	6	23.37
Birth Asphyxia	4	14.52
Respiratory distress syndrome	2	3.56
Transient tachypnoea of new born	5	6.40
Neonatal mortality	3	6.50
Intrauterine death	0	0
None	10	42.65

**Table 4: Neonatal morbidity and mortality in GDM**

Only with diet therapy, blood sugar values at follow up	6 week post partum N:27		3 months post partum N:27	
	Frequency	%	Frequency	%
FBS≤95 mg/dl	10	37.03	9	33.33
PPBS≤120 mg/dl	9	33.33	7	25.92
RBS≤120 mg/dl	8	29.62	0	0

**Table 5: Effect of dietary therapy on blood sugar values at postpartum follow-ups.**

Fasting blood sugar levels achieved at 6 weeks postpartum followed by 3 months postpartum in both groups of patients achieving glycemia- one that only with diet and the other who needed insulin for glycemic control, were not much different statistically.<sup>4</sup> Patients maintained their PP2BS levels and 2 maintained their RBS level ≤120 mg/dL at 6 weeks postpartum. Only one had maintained her PP2BS level ≤120 mg/dL but not a single woman had been able to maintain desired glycemia at random measurement at 3 months postpartum from those who were taking insulin beforehand for it.

No oral hypoglycemic drugs were used in this study. Also, Glyburide is not available easily in rural area. Metformin can be alternatively used and easily available but due to the ongoing Meig trial for Metformin efficacy which is yet not proved.

#### **IV. Discussion:**

Worldwide prevalence of GDM varies between 0.6 - 13.7% (WHO) criteria.<sup>7</sup> The prevalence of GDM in India varies from 3.8 to 21% in different parts of the country, depending on the geographical locations and diagnostic methods used. GDM found to be more prevalent in urban than rural areas according to DIPSI (Indian Guidelines for GDM).<sup>8</sup> According to British Nutrition Journal GDM affects 1 to 14% of all pregnancies which is comparable to this study.<sup>9</sup> Uncertainties over its diagnosis and lack of agreement over which screening protocols and diagnostic thresholds should be used make GDM prevalence estimates difficult.

Prevalence of GDM was found to be highest among the 26-30 year age group in this study. Indian Journal of Community Medicine-2008 showed the mean age of study group 25.2±7.6 years.<sup>10</sup> Various authors from India have observed GDM in higher age groups, majority of which were carried out in urban areas. In this study majority of women were in 26-30 years group (62.96%). The reason for it is likely to be because most of the women in rural area get married at young age and their families are completed by the age of 30 years. Therefore, they are likely to undergo sterilization around this period. Hence there is decline in number of pregnant women after the age of 30 years. Moreover, GDM clinically follows the pattern of type 2 diabetes and not the juvenile type which appears at young age.

Implementation of dietary therapy and its success rate in achieving desired glycemic levels solely depends upon patient compliance. Many limiting factors exist in rural area which may disable patients to adhere to strict guidelines and instructions given to them in order to achieve desired outcome.

#### **V. Conclusion:**

Prevalence of GDM was comparable to that of other studies. Rate of caesarean section was very high and main indications being foetal distress and cephalopelvic disproportion. Maternal and perinatal morbidity increases as duration of GDM increases. Control of glycemia with dietary treatment can help reduce occurrence of complications in mother and baby. It requires proper compliance, absence of which calls for need of insulin in most of patients with uncontrolled glycemia since first.

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