

## Original research article

# Risk factors in gestational diabetes mellitus-a – A prospective study

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## ABSTRACT:

**INTRODUCTION:** Gestational diabetes mellitus (GDM) continues to be a significant health disorder triggering harmful complications in pregnant women and foetus. As women with gestational diabetes mellitus (GDM) and their children are at increased risk of developing diabetes mellitus in future, special attention should be paid to this population especially in developing countries like India.

**AIMS:** To determine the prevalence of risk factors in GDM women in this part of country and develop methods ,and teach pregnant women to prevent it

**MATERIALS AND METHODS:** GDM women > 24 WEEKS of gestational age attending Diabetic out patient department In two tertiary care medical colleges hospitals were taken for study after getting written consent .study period is from Jan 2018 –June 2018 .

**RESULTS:** Total number of 140 GDM patients consented for study out of 188 patients. .GDM patients significantly older. Family history of DM, history of GDM, history of PCOS and physical activity are significantly associated with GDM. complications like PIH -27.6%, abortion-25%, macrosomia -5.3% and Previous history of LSCS- 37.2% are seen.

**CONCLUSION:** GDM is associated with a higher risk of adverse health outcomes for both mothers and offspring, not only during the peri natal phase but also in the long term. Thus, the prevention and management of GDM must be given enough importance throughout pregnancy that is prior to pregnancy, during pregnancy, and postpartum period as health education, right food ,exercise and regular medical check up and follow up.

## INTRODUCTION

Gestational diabetes mellitus (GDM) is defined as “any degree of glucose intolerance with onset or first recognition during pregnancy. The increased prevalence is attributed to the aging population structure, urbanization, the obesity epidemic and reduced physical inactivity. Not surprisingly in parallel with the increase in diabetes prevalence, there seems to be an increasing prevalence of GDM. Among ethnic groups in South Asian countries, Indian women especially south Indians have the highest frequency of GDM necessitating universal screening. Indian women have 11-fold increased risk of developing GDM. The prevalence of GDM in Tamilnadu is 17.9%. GDM is characterized by pancreatic  $\beta$ -cell dysfunction and decrease in tissue sensitivity to insulin. Lack of ability to secrete more insulin to meet the increased demands of pregnancy and to compensate for the insulin resistance, leads to development of hyperglycemia. Although prevalence of diabetes is alarmingly high among Indians there have been very few studies assessing the effect of diabetes on pregnancy outcomes.

Existing metabolic disturbances are associated with substantial rates of maternal complications such as pregnancy-induced hypertension, preeclampsia, poly hydramnios, urinary tract infection, premature birth, caesarean delivery and fetal/neonatal complications, such as macrosomia, shoulder dystocia, birth injuries as bone fractures and nerve palsies, hypoglycemia .In pregnancies complicated by diabetes, it would lead to increased risk of developing type 2 diabetes in later life. Offspring of women with GDM are at increased risk for childhood obesity, retarded psychomotor development and early onset of glucose intolerance and type 2 diabetes mellitus. Women with gestational diabetes were found to have a 20 to 50% risk of developing impaired glucose tolerance and Type 2 diabetes in the next 5 to 10 years following pregnancy.

In all pregnant women challenge and/or diagnostic test was performed according to Polish Diabetes Association. The screening test for GDM was based on two-step approach. Women underwent 1h 50-g glucose challenge test between 24 and 28 weeks of pregnancy. If the plasma glucose value at 1 h was  $\geq 7.8$  mmol/l ( $\geq 140$  mg/dl), a patient was asked to undergo a 2-h 75-g oral-glucose-tolerance test (OGTT) after an overnight fast. GDM was diagnosed when glucose value at 2 h exceeded 7.8 mmol/l ( $>140$  mg/dl)<sup>(5)</sup>.

Risk factors for diabetes were quantified for each pregnant woman: age at conception, height and weight before pregnancy, pre pregnancy nutritional status described as BMI, parity, prior macrosomia, family history of diabetes, glycosuria in current pregnancy (more than one event).Based on occurrence and value risk indicators following groups of pregnant women with different risk for GDM were selected: (a) high-risk group: maternal age  $\geq 35$  years, pregravid overweight and obesity (BMI  $\geq 27$  kg/m<sup>2</sup>), history of diabetes mellitus in a first degree relative, parity , history of macrosomia, glycosuria;(b) low-risk group: maternal age  $<25$  years, weight normal before pregnancy (BMI  $<25$  kg/m<sup>2</sup>), not known diabetes in first-degree relatives, no history of poor obstetric outcome; (c) moderate-risk group: including women who did not meet inclusion criteria on particular groups.

The GDM women were significantly older, had significantly increased mean BMI and they had high parity, than healthy pregnant ones. Maternal complications occurring in GDM are pregnancy-induced hypertension, maternal infection, fasting hyperglycemia, etc. Pregnancy complications include abortion, preterm labor, hydramnios and unexplained fetal deaths. Fetal complications are fetal macrosomia, fetal malnutrition, neural tube defects and cardiac anomalies like ventricular septal defect, atrial septal defect, etc.

The purpose of this study is to estimate the prevalence of risk factors for GDM among women in order to provide not just a warning for future development of impaired glucose tolerance and diabetes to the mother and infant, but also to provide an opportunity to improve perinatal care and intervention, as well as to develop clinical strategies for its prevention. Early case detection and institution of control measures have proven valuable in reducing the complications due to GDM

#### **OBJECTIVES:**

The aim of the study was to evaluate the prevalence of gestational diabetes mellitus (GDM) and the presence of risk factors for GDM and their predictive value.

**METHODOLOGY:**

Risk factors for diabetes were quantified for each pregnant woman: age at conception, parity, overweight/obesity, prior macrosomia and family history of diabetes.

INCLUSION CRITERIA: Age 18 years and above pregnant women.

Diagnosed to have GDM utilizing the Carpenter and Coustan Criteria, Signed informed consent

EXCLUSION CRITERIA: Pre-gestational diabetes (Type 1 or Type 2)

Long term medical/surgical conditions that may affect glucose metabolism, such as postpancreatectomy, acromegaly, hyperthyroidism. Long term intake of medications that may affect glucose metabolism such as steroids and  $\beta$ -adrenergic agonists, anti- psychotic drugs.

**Based on the study objectives, the following target parameters for evaluation will be evaluated:**

1. Positive family history of diabetes
2. Positive history of GDM,
3. Age
4. Socio economic status
5. Education
6. Parity
7. Pre-pregnancy weight and BMI
8. Greater weight gain during pregnancy
9. History of infertility.
10. History of polycystic ovarian syndrome
11. Chronic hypertension
12. History of stillbirth pregnancies and abortion.
13. History of macrosomia

**RESULTS:**

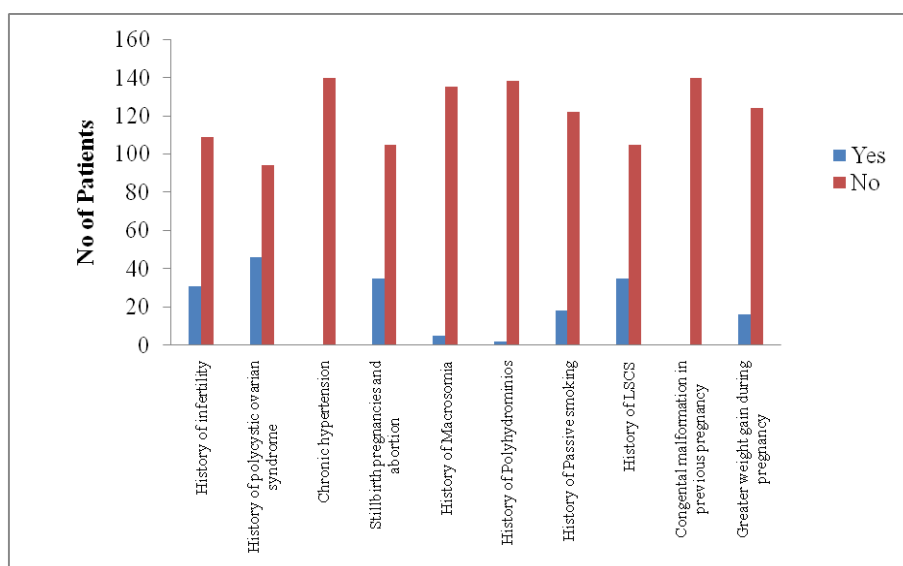
**1. Distribution of study population according to age group (N=140)**

Age group	Number	Percent (%)	Cumulative percent (%)
21-30	102	72.9	0
31-40	36	25.7	98.6
>40	2	1.4	100.0
<b>Total</b>	140	100	

**2. Distribution of study population according to Parity (N=140)**

Status	Number	Percent (%)
<b>PRIMI</b>	46	32.9
<b>NON PRIMI</b>	94	67.1
<b>TOTAL</b>	140	100.0

3.6% of study population had H/O Macrosomia. Out of 94 multigravida 5 cases have History of Macrosomia delivered. 5.31% have history of macrosomia.25% of study population had H/O LSCS



**Graph: Distribution of study population according to Parity**

**DISCUSSION:**

Our study totally 140 GDM mothers are analysed for risk factors. From above data there is a association between age and development of GDM. Majority of the study population (72.9%) are in the age group of 21-30 years. But cumulative percentage 98.6% in the age group of 31-40 years and 100% in the age group of >40 years. The probable reason may be education, job, late marriage and parity. In 2013 pilot study conducted in Kollam reports 75% of women with GDM were also above 25 years of age. The probable reason may be that in the study considered population was well-educated and were working and most of them were multiparous. Even though, they are aware of chance of getting GDM with increasing age they never give it an importance in their busy schedule

As per our study results majority of them belongs to middle (42.1%) and upper (35.7%) socio economic status.22.2% belongs to lower socioeconomic status in our study. The upper socioeconomic status people have sedentary life style and food habit may be the reason for GDM and lower socioeconomic status

people had no screening test for GDM or pre-natal check-up. In our study report primi 32.9% and multigravida 67.1%. So parity is indirectly linked to GDM. In multigravida age, weight gain and previous history of GDM are the probable reasons.

According to our study the prevalence of family history of Diabetes in GDM patients is 45.7%. The role of family history of gestational diabetes in first-degree relatives is highly significant in our study. As per our study results around 24.3% of study population had positive H/O GDM. Out of 94 cases of multigravida 34 cases have positive history of GDM

According to our study out of 94 multigravida 26 have H/O PIH. 27.6% GDM have H/O PIH. Around (100%) of study population did not have Chronic Hypertension. GDM provide an increased risk of PIH, due to increase in insulin resistance. A greater degree of insulin resistance is present in PIH, by different mechanisms of insulin such as associated endothelial dysfunction, sodium retention in kidneys, activation of sympathetic nervous system, and increased level of transportation of cations<sup>(9)</sup>. Berkowitz GS et al. firstly assessed the association between history of infertility and GDM, and he found that women with a history of infertility were at an increased risk for GDM

Pathogenesis for infertility, which makes infertility share the parallel mechanism with Diabetes. Social-psychological factors such as demographic factors, lifestyle, environmental factors and psychological factors; physiological and pathological factors, such as anatomy, endocrinology and metabolism, infection and endometriosis are parallel mechanism for infertility and GDM. As per our study 22.1% have taken infertility treatment.

As our study analysis reports 32.9% GDM patients had a history of PCOS. In PCOS increased insulin resistance which may be responsible for the occurrence of GDM. Pregnant women with a history of PCOS have a more than two-fold increased probability of GDM compared with women without PCOS. As regard abortion our study shows the prevalence as 25%. 3.6% of study population had H/O Macrosomia. Out of 94 multigravida 5 cases have History of Macrosomia delivered. 5.31% have history of macrosomia in our study. High percentage of insulin usage and good glycemic control are the reasons for less prevalence of macrosomia. In our study reports 1.4% have polyhydramnios. It is no association in our study. A study on prevalence of GDM in South Kerala during 2002 showed that the prevalence of GDM reported with hydramnios 7%<sup>(8)</sup>.

In our study out of 94 multigravida GDM 35 patients had previous history of LSCS. Around 37.2% had previous history of LSCS. The indication of LSCS in our study is maternal and fetal complications like hydramnios, oligohydramnios, CPD, Pre-eclampsia, macrosomia and Fetal distress. Around 11.4% of GDM mother have greater weight gain during pregnancy. This may due to Macrosomia, Hydramnios, obesity, over nourishment, lack of physical activity, inadequate blood glycemic control and insulin adverse effect. Around 60% of the GDM patients have light physical activity. There is strong association between GDM and physical activity

#### **CONCLUSION:**

The risk factors such as increased age of pregnant women, overweight and obesity, lack of exercise and diet control, GDM in first-degree relatives and sedentary life style predispose to GDM. The presence of GDM also increases the risk of having cesarean deliveries. We suggest that all pregnant women should undergo laboratory screening for GDM. The preconceptional use of metformin in PCOS women protects the pancreatic beta cell reserve preventing or delaying the occurrence of GDM. Physical activity and dietary advice represent the first

choice. When lifestyle modification is insufficient to maintain normoglycemia in women with GDM, drug treatment is needed. Thus, the prevention and management of GDM must be given enough importance throughout pregnancy, that is, prior to pregnancy, during pregnancy, and postpartum.

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