

# Determinants of Gestational Diabetes Mellitus at Tertiary Care Hospital of Lahore

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## Abstract:

Gestational Diabetes Mellitus (GDM) is defined as glucose intolerance of varying degree with onset or first recognition during pregnancy. Prevalence of GDM is known to vary widely depending on the region of the country, dietary habits, and socio-economic status.

## Objective:

To find out the determinants of gestational diabetes mellitus at Tertiary Care Hospitals of Lahore.

## Methods:

A cross sectional study was conducted at Sir Ganga Ram Hospital and Lady Willington Hospital, Lahore on 100 clinically diagnosed GDM patients Data were collected through pre-tested questionnaires. The data were analyzed using SPSS version 21.0.

## Results:

Among the individuals 79% were having family history of diabetes, while 67% of individuals were taking stress and 99% of individual were physically inactive. 70% females were aged between 20-30 years, 85% of females had Body Mass Index (BMI) greater than 25 which was one of the main determinant of gestational diabetes, 48% females were belonging to middle class families.

## Conclusions:

According to the findings of current study, socio-economic status, family history and physical inactivity were major risk factors of gestational diabetes mellitus. BMI was also a main risk factor of gestational diabetes mellitus.

## Keywords:

Gestational diabetes mellitus, Body mass index, Blood glucose, Stress, Physical inactivity.

## Introduction:

Gestational Diabetes Mellitus (GDM) determined as any level of glucose intolerance during pregnancy.<sup>1</sup> GDM occurs in 2 to 9 percent of all pregnancies and is associated with substantial rates of maternal and perinatal complications.<sup>2</sup> The prevalence of Diabetes Mellitus (DM) is increasing worldwide and more in developing countries. The increasing prevalence in developing countries was related to increasing urbanization, decreasing levels of physical activity, changes in dietary patterns and increasing prevalence of obesity. As women with GDM and their children are at increased risk of developing DM in future.<sup>3</sup> Physical activity has been associated with a reduced risk of type 2 DM. Diabetes is a metabolic disorder causing hyperglycemia due to insulin secretion defects, when fasting blood glucose levels are more than 125mg/dL. There are three types of diabetes: insulin dependent diabetes or type 1 diabetes, type 2 diabetes or non-insulin dependent diabetes and gestational diabetes which develops in pregnancy.<sup>4</sup> GDM was defined as the beginning of glucose intolerance during the time period of pregnancy, it may increase the risk of prenatal morbidity and mortality. GDM was associated with an increased frequency of gestational, perinatal and neonatal complications. As females with GDM and their youngsters were at increased risk of developing DM in their future life.<sup>5</sup> A study was conducted by Bhat M *et al.*, in 2010 to determine the determinants of GDM, a case control study was performed on 300 GDM women. According to their results pre pregnancy BMI  $\geq 25$  was significantly higher in cases of controlled group

which was 37%, 38% had GDM due to personal crisis or family history, 22% had Urinary Tract Infection (UTI) and 3% had done treatment of infertility.<sup>6</sup> In another study done by Chu SY *et al.*, in 2007 showed that high maternal weight increases risk of gestational diabetes.<sup>7</sup> Pirkola J *et al.*, proved that overweight before pregnancy leads toward the risk factors of hypertension and diabetes, this study was conducted in 2010.<sup>8</sup> A study conducted in 2011 by Bener A *et al.*, this study showed that obesity was a major risk factor of gestational diabetes. This study also proved that maternal age, weight, family history of diabetes, obesity and low monthly income were main risk factors of gestational diabetes mellitus.<sup>9</sup> It is stated in a study by Buchanan A *et al.*, 2005 that high glucose level during and after pregnancy was related with the risk of type 2 diabetes. Other risk factors of gestational diabetes were obesity, weight gain and increasing age.<sup>10</sup> Study conducted by Jacobsson B *et al.*, 2004 who related the complications and age of pregnant females to identify the risk factors of gestational diabetes in 2004. With the risk of maternal and infant death also increased. Risk of illnesses and pregnancy complications also increases with the age. Premature birth and gestational diabetes were common in 45 years old females.<sup>11</sup>

Study aimed to identify all causes of gestational diabetes mellitus during pregnancy. These causes may be readdressed through creating the awareness by health education to pregnant females. As no reliable method of identifying subjects at increased GDM at this stage, so all pregnant women should undergo laboratory screening for diagnosis in order to control it after immediate detection of GDM.

### Methods:

A cross sectional study was conducted at Sir Ganga Ram Hospital and Lady Willington Hospital, Lahore on 100 clinically diagnosed GDM patients Data were collected through pre-tested questionnaire. The data were analyzed

using SPSS version 21.0.

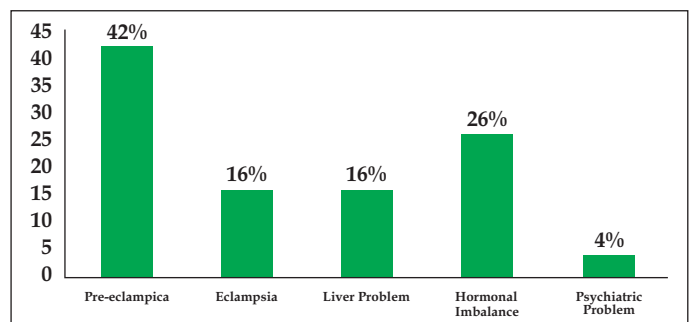
### Results:

Analysis revealed that there were 70% females having GDM, aged between 20-30 years. 48% belonged to middle class families, 50% were obese, 62% individuals were suffering from GDM in second trimester and 79% had family history of GDM according to Table 1.

Demographic	Percentage of GDM%
Age 20-30 years	70
Middle Class	48
Obese	50
During Second Trimester	62
Family History of Diabetes	79

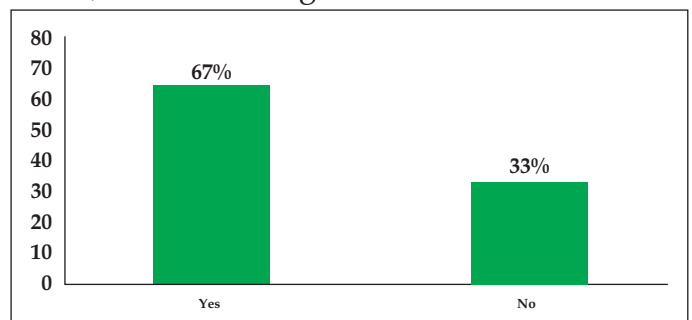
**Table 1:** Demographics of pregnant females

According to Figure 1, 42% of females were suffering from preeclampsia, 16% from eclampsia, 16% from liver problems, 26% from hormonal imbalance and only 4% were suffering from psychiatric problems.



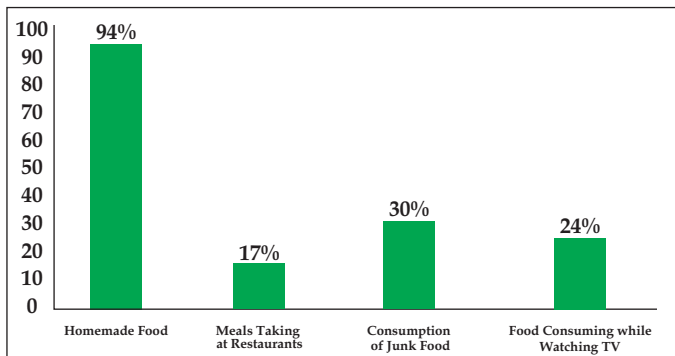
**Figure 1:** Associated diseases during pregnancy

Analysis revealed that 67% individuals were taking severe stress. While only 33% were not in stress, as shown in Figure 2.



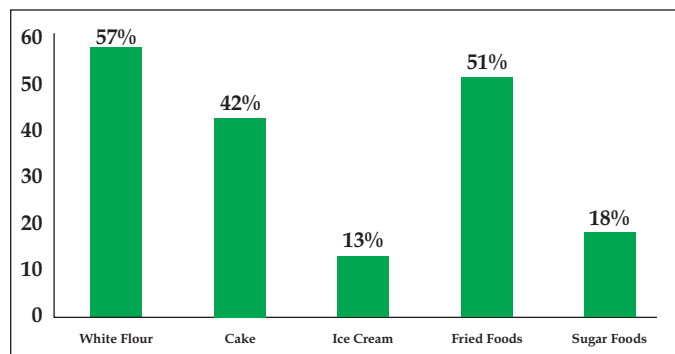
**Figure 2:** Distribution of pregnant females with stress

Most of the females with gestational diabetes were physically inactive. 99% of females were physically inactive which was one of the major causes of GDM. According to figure 3, 94% were taking homemade food, 17% were mostly taking meals at restaurants, 30% liked to eat junk food and 24% were watching TV while eating.



**Figure 3:** Frequency of eating habits

According to figure 4, 57% of individuals were preferring white flour (for chapatti), 42% cake, 13% ice-cream, 51% fried food items and 18% were preferring to eat more sugary foods.



**Figure 4:** Frequency of eating preferences

### Discussion:

Findings of current study revealed that 70% females were aged between 20-30 who had GDM, similar findings were revealed by Xiong X *et al.*, in 2001, they concluded that factor of age may be the determinant for causing GDM.<sup>5</sup> Current study revealed that 41% females were from lower socio-economic status, while 48% were belonged to middle socio-economic status. Similarly, a study was conducted by Bener

A *et al.*, they also concluded that low monthly income was main risk factor for GDM.<sup>9</sup> According to the results of current study prevalence of BMI greater than 25, was 85%. A study done by Kim C *et al.*, in 2010 support the above results, they also concluded that outbreak of obesity significantly increased the risk of GDM.<sup>12</sup> A study done by Chu SY *et al.*, concluded that high maternal weight increase risk of GDM.<sup>7</sup> Similar, study was done by Weijers R N *et al.*, 2002 according to their results increased BMI were the major cause of GDM.<sup>13</sup> Findings of current study stated that 79% had family history of DM. Similarly, a study conducted by Benner *et al.*, support the above results, as according to the results of their study family history were one of the main cause of GDM.<sup>9</sup> Another study conducted by Rajput R *et al.*, 2013 also support the results, they concluded that family history played important role in occurrence of GDM.<sup>3</sup> Current study showed that 99% of females were physically inactive. A study was conducted by Kim C *et al.*, according to their results less physical activity and family history of diabetes were main causes of GDM.<sup>14</sup> According to Hu FB *et al.*, physical activity, regular exercise help to controlled the glucose level during pregnancy and minimizes the chances of GDM.<sup>15</sup> According to current study 42% of individuals were suffering from pre-eclampsia. According to study conducted by Xiong X *et al.*, in 2001 females who had GDM had increased risk of developing pre-eclampsia.<sup>5</sup> Current study showed that 57% of individuals preferred to eat white flour, 18% sugary foods, 51% fried food items, 42% cakes and 13% preferred to eat ice-cream. Study conducted by Radesky J S *et al.*, in 2008 revealed that diet high in saturated fat, processed food and sugary foods with high glycemic index and high glycemic load develop the risk of GDM.<sup>16</sup> In another study carried out by Zhang C *et al.*, during 2006 stated that in pregnancy diet might be linked with the risk of GDM. Low fiber diet or diet high in glycemic load was directly

linked to the increased risk of GDM<sup>17</sup>.

### Conclusions:

According to current studies family history, physical inactivity and obesity were found to be major determinants of GDM. It was also concluded that majority of gestational diabetic females were experiencing a lot of stress which showed to have direct relationship with occurrence of gestational diabetes.

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