

DOI: <https://dx.doi.org/10.18203/2320-1770.ijrcog20263032>

Original Research Article

Prevalence of gestational diabetes in Lucknow region

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Received: 28 May 2026

Revised: 03 August 2026

Accepted: 04 August 2026

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ABSTRACT

Background: Gestational diabetes mellitus (GDM) is one of the most prevalent complications of pregnancy and is associated with adverse maternal and neonatal outcomes, and is a risk factor for future development of type 2 diabetes mellitus. Objective was to find out the prevalence of GDM in Lucknow region by the fasting blood glucose (FBG) and 75 gm oral glucose tolerance test (OGTT).

Methods: The study was carried out as a cross-sectional study among second and third trimester pregnant women. The subjects were divided into normoglycemic and hyperglycaemic groups according to FBG, OGTT and urine glucose analysis.

Results: The overall prevalence of GDM was 9.6%. Sixty percent of all women affected were from urban areas and 40 percent were from rural areas. FBG value and OGTT value in the hyperglycaemic group were significantly high ($p < 0.001$) and positive glucosuria ($p < 0.001$) was observed.

Conclusions: Routine screening, antenatal monitoring, and lifestyle modification are important to minimize the undesirable outcomes of GDM and its long-term consequences of type 2 diabetes mellitus.

Keywords: Fasting blood glucose, Gestational diabetes, Oral glucose tolerance test, Pregnancy outcomes, Rural and urban

INTRODUCTION

Diabetes is a major non-communicable disease and a growing burden of disease around the world.^{1,2} It is a global disease affecting both developed and developing countries and has been linked with significant metabolic and vascular complications.³ Glucose intolerance becomes a particular problem in pregnancy as it can impact both the mother and the baby. GDM is defined as the development of glucose intolerance that is first recognized during pregnancy, typically in the 2nd half of gestation.⁴ One of the most frequent medical conditions of pregnancy, it can result in issues like pre-eclampsia, caesarean section delivery, and type 2 diabetes mellitus in the mother.^{5,6} Insulin resistance, beta cell dysfunction and genetic susceptibility plus environmental and dietary factors all affect its development.⁷ GDM is becoming more prevalent

and the importance of early screening and regular checks during pregnancy. The present study was conducted to know the prevalence of GDM among pregnant women of Lucknow area using FBG, OGTT and urine glucose analysis and also to compare the results of GDM between rural and urban pregnant women.

American Diabetes Association guidelines for diabetes diagnosis are based on these factors: HbA1C above 6.5%, levels of fasting plasma glucose above 126 mg/dl, oral glucose tolerance test (OGTT) of 75g done with 2 hours glucose concentration of 160 mg/dl or more. Classic symptoms such as high blood sugar, high blood pressure, excessive thirst, frequent urination or unexplained weight loss combined with a random blood sugar level of 160 mg/dl or higher. Patients showing clear diabetes symptoms skips further confirmatory tests.

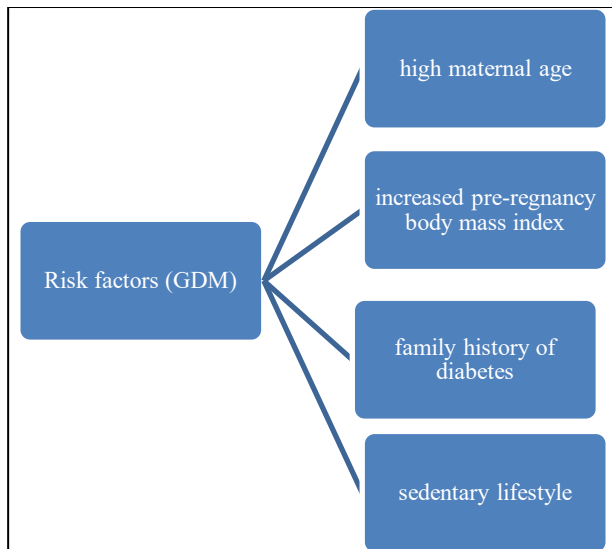


Figure 1: Risk factor of gestational diabetes.

As per WHO guidelines we diagnosed gestational diabetes if any value hit the threshold during pregnancy. Participants split into two groups based on blood sugar levels: group I (normoglycemic) and group II (hyperglycemic) as shown in Table 1 below.

Table 1: Blood sugar levels as per WHO.

Test parameters	Group I (normoglycemic)	Group II (hyperglycemic)
FBG	<92 mg/dl	≥92 mg/dl
OGTT (I hour)	<100 mg/dl	≥100 mg/dl
OGTT (II hours)	<153 mg/dl	≥153 mg/dl

Aim and objectives

Aim

This study attempted to find out the prevalence of gestational diabetes (GDM) based on the fasting blood glucose (FBG) OGTT parameters in pregnant women of 20-32 weeks' gestation and on urine glucose analysis. The major aims were to estimate the prevalence of GDM using fasting blood glucose (FBG), (1 hour) or (2 hours) oral glucose tolerance test (OGTT) and Benedict's urine glucose test in pregnant women, to determine the prevalence of GDM among pregnant women from rural and urban areas of the study.

Objectives

To assess GDM prevalence through FBG, (1hour) OGTT and (2-hour) OGTT value and Benedict's urine glucose test in pregnant women. To assess GDM prevalence of gestational diabetes mellitus (GDM) among pregnant women from rural and urban areas.

METHODS

The cross-sectional study was carried out at the, Gean Lucknow, Uttar Pradesh, between February 2024 and July 2024. The study obtained approval from the Institutional Ethical Committee of the Sai Institute of Paramedical and Allied Sciences and written informed consent was taken from all the participants before enrolment. Initially 125 pregnant women were recruited, making a total of 85 women who completed testing for the final analysis and 40 women who were unable to complete testing.

In the study, pregnant women who had never had pregestational diabetes or abnormal fasting and/or postprandial glucose levels in their previous pregnancies were included in the second or third trimester of gestation (20-32 weeks). Patients with known type 1 or type 2 diabetes mellitus, chronic kidney disease, acute kidney injury, chronic stress, and patients who were on steroids were excluded. Blood glucose estimation was done by the glucose oxidase-peroxidase method with fully automated Erba analyser. A 75-gm oral glucose tolerance test was performed and the glucose was evaluated in the urine using Benedict's test with colour changes interpreted.

Table 2: Demographic data of the study participants between the two groups.

Variables	Group I (n=70)	Group II (n=15)
Mean age (years)	26.4±3.2	27.1±2.8
Urban residence (%)	52	60
Rural residence (%)	48	40

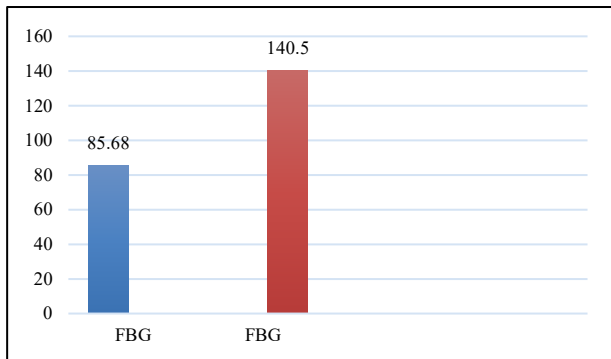
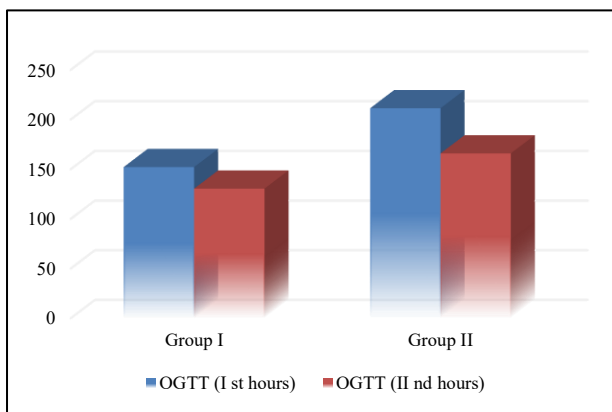
Women were considered normoglycemic if FBG was <92 mg/dl, 1-hour OGTT was <180 mg/dl, and 2-hour OGTT was <153 mg/dl. Those women whose values at one or more of these cut-offs were at or equal to the cut-off were considered hyperglycemic. To compare the two groups, a statistical analysis was performed, and a p value of <0.001 was taken as a statistically significant value.

RESULTS

Table 3 shows that the fasting blood glucose and OGTT values were significantly lower in group I (n=70). They were asked to provide urine samples, and their results were all positive for the presence of glucose (which is indicated by a blue colour). Group II (n=15) women, in which 60% belongs to urban area and remaining 40% from rural area however, posted much higher fasting blood glucose and OGTT readings. The colour of urine was green to yellow, orange, and red indicating the increasing amount of glucose. All the test result show significantly higher in group II as compared to group I with the p value of <0.001 for all parameter. In total, 9.6% of the participants were diagnosed with gestational diabetes, placing them at a higher risk for developing type 2 diabetes and other issues later in life.

Table 3: Level of FBS, OGTT and urine analysis between the two groups.

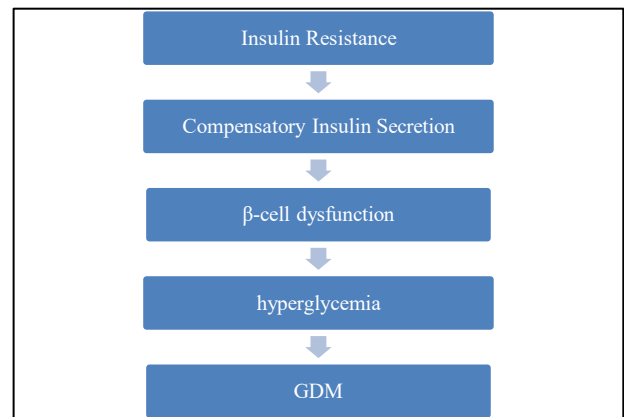
Test parameters	Group I (n=70)	Group II (n=15)
FBG	85.68±5.08	140.50±8.70
OGTT (1 hours)	152.04±13.40	171.27±17.40
OGTT (2 hours)	130.36±10.40	85.82±8.9
Urine analysis	Negative	Positive

**Figure 2: Level fasting blood glucose level in group I and group II.****Figure 3: Level oral glucose tolerance test level in group I and group II.**

DISCUSSION

The difference between FBG, OGTT and Urine glucose between the hyperglycaemic and normoglycemic groups was statistically significant in the present study. The results reinforce the importance of regular glucose screening in pregnancy for detection of GDM at an early stage. The prevalence reported in the current study was 9.6%, similar to studies conducted in India, and indicating that GDM is still a public health concern in India.^{8,9} The similar kind of figure were observed in systematic review by Mantri et al and Sweeting et al reported prevalence rate of 9-12% in comparable populations.^{2,5} The study was made by Sharma et al⁸ had recorded higher prevalences in urban area which cause due to change in life style.

This illustrates that GDM is not just a condition of pregnancy, but one with lifelong implications for mother and child, driven by a number of lifestyle factors that contribute to the higher risk seen in urban women, such as reduced physical activity levels, excess food consumption, obesity and a family history of diabetes.¹⁰⁻¹³ Early detection, dietary counselling, regular exercise and close antenatal follow-up are key for minimizing maternal and neonatal complications, and decreasing the risk of future development of type 2 diabetes mellitus.

**Figure 4: Pathophysiology of gestational diabetes.**

The study comprised a fairly small population and took place in a single centre, thus restricting the generalizability of the findings. This level was not included, so it might have included further glycemic data. Long-term follow-up is required in larger multi-centre studies for a better understanding of long-term outcomes.

CONCLUSION

Gestational diabetes mellitus is a significant health issue in Lucknow area. The findings of this study agree with the need for regular antenatal screening particularly in women with other risk factors such as obesity, family history of diabetes and sedentary lifestyle. Early diagnosis and intervention would minimize maternal and neonatal complications, and decrease the risk for future type 2 diabetes mellitus.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Bajpai S, Pant N, Jafri TR, Mishra A, Andriyas EA. Prevalence of gestational diabetes in Lucknow region. *Int J Reprod Contracept Obstet Gynecol* 2026;15:3493-6.