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Original Research

To determine the gestational diabetes mellitus (GDM) and gestational glucose intolerance (GGI) in pregnant woman

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ABSTRACT:
Aim: To determine the gestational diabetes mellitus (GDM) and gestational glucose intolerance (GGI) in pregnant woman. **Materials and methods:** The cross-sectional research was conducted at the nursing department with clearance from the ethics committee. This research involved 600 prenatal moms in total. Patients who had previously been diagnosed with diabetes mellitus and were unable to participate in this trial were excluded. The questionnaire has been pre-tested and prepared. The questionnaire used to collect data on numerous epidemiological parameters in pregnant women with gestational diabetes mellitus. **Results:** Among 600 tested prenatal moms, 20 (3.33%) were found to be GGI positive, 50 (8.33%) were found to be GDM positive, and 530 (88.34%) were found to be OGTT negative. The majority of prenatal moms were multigravida with GGI (85%) and GDM (92%). The difference between gravid and GGI and GDM prenatal women was not statistically significant ($p>0.05$). The majority of prenatal moms were in their second trimester, with GGI (50%) and GDM (64%). GDM in prior pregnancy with GGI and GDM was reported in 2 (10%) and 3 (6%) cases with statistical significance, respectively. Only GDM prenatal moms (4%) had the IUD, which was statistically significant (P0.05). (P0.05) Only GDM prenatal moms (4%) had an early abortion and a deformed baby, which was statistically significant. ($P<0.05$). **Conclusion:** The current research group had an 8.33% prevalence of Gestational Diabetes Mellitus. The rise in GDM prevalence in our sample might be linked to an increase in BMI, since high maternal weight is associated with a much increased risk of GDM. The growing incidence of Gestational Diabetes in the community, as well as the increased risk of pregnancy and delivery difficulties, warrants screening expecting women who frequent the prenatal clinic.
Keywords: GDM, GGI, pregnant woman

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INTRODUCTION

India has been designated as the "World Diabetes Capital." Diabetes is a serious health issue in India, with prevalence rates ranging from 4.6% to 14% in urban regions and 1.7% to 13.2% in rural areas. Type 2 Diabetes mellitus affects an estimated 62 million individuals in India, with the figure anticipated to rise to 79.4 million by 2025. [1] The incidence of gestational diabetes mellitus is increasing in tandem with the prevalence of diabetes. Gestational Diabetes Mellitus is described as glucose intolerance of varying degree that occurs throughout pregnancy, regardless of insulin therapy. [2]

GDM is linked to a slew of prenatal, neonatal, and maternal problems. Miscarriage, macrosomia, congenital abnormalities, stillbirth, and unexplained intrauterine foetal death are examples of foetal difficulties. Respiratory distress syndrome, hypoglycemia, hypocalcemia, hypomagnesemia, hyperbilirubinemia, polycythemia, cardiomyopathy, diabetes inheritance, and long-term cognitive development are among the newborn problems. Diabetic nephropathy, diabetic retinopathy, diabetic neuropathy, preeclampsia, antepartum haemorrhage, diabetic ketoacidosis, infections, shoulder dystocia, higher genital tract injuries, and an increased incidence of caesarean section are among the maternal problems. [3]

3% to 8% of pregnant women have gestational diabetes mellitus (GDM).[4] Women with a history of GDM are classified as having type 2 diabetes mellitus at a young age (DM). Women who have a history of GDM should be monitored for at least 6 to 12 weeks after giving birth to establish their glucose status.

Within 12 weeks after birth, 2.6% to 38% of women with GDM developed DM. [5-8]

According to the longest follow-up statistics, up to 50% of women with a history of GDM may acquire DM during a 20- to 30-year period, or 30% may get DM within 10 years after delivery.[9] DM onset is roughly 7 times greater in women with GDM than in those without GDM. [10] Evaluating postpartum glucose intolerance (GI) is critical for preventing DM onset and consequences, since patients may then consider early therapies for glucose tolerance. However, risk factors for DM development in women with a history of GDM are yet unknown. Several papers based on long-term observations of predicted variables for DM onset after GDM have been published. [11,12]

In women with a history of GDM, the long-term follow-up rate of postpartum glucose testing is poor.[13]. The annual follow-up rate after the first year postpartum is about 20%.[14] There are many challenges to postpartum diabetes testing, including a lack of time to do the glucose test, a lack of information that one may belong to a high-risk DM onset group, and a lack of awareness among medical personnel of the test's use. [15]

MATERIALS AND PROCEDURES

The cross-sectional research was conducted at the nursing department with clearance from the ethics committee. This research involved 600 prenatal moms in total. Patients who had previously been diagnosed with diabetes mellitus and were unable to participate in this trial were excluded. The questionnaire has been pre-tested and prepared. The questionnaire used to collect data on numerous epidemiological parameters in pregnant women with gestational diabetes mellitus.

METHODOLOGY

The goal of the research was presented to the study volunteers. The informed consent was obtained. To collect information on socio-demographic and epidemiological parameters, a pre-structured questionnaire was employed. All women who attended prenatal care clinics were questioned and data was gathered on them. Demographic data, prior obstetric history, prior medical history, and laboratory examinations were all included. There was also information on the current pregnancy, including fundal height, pregnancy type, and maternal status. Blood pressure, weight, and symphysio fundal heights were measured at the antenatal clinic visit. Every patient, regardless of her last meal time, received 75mg oral glucose. In the central laboratory, plasma glucose was measured after 2 hours. With 75mg oral glucose (per DIPSI criteria):

Plasma glucose after 2hours	Pregnant	Non pregnant
>/= 200mg/dl	Diabetes	Diabetes
140-199 mg/dl	GDM	IGT
120-139 mg/dl	GGI	---
< 120mg/dl	Normal	Normal

STATISTICAL ANALYSIS

Statistical analysis was performed using proportions and percentages for qualitative characteristics and chi-square or z-test, ANOVA for quantitative data where appropriate. Data was compared and statistically examined to determine the significance of any found changes. The data were presented as Mean Standard Deviation (SD), and a p value greater than 0.05 was deemed significant. For statistical analysis and drawing conclusions, the Statistical Package for Social Sciences (SPSS) version 25.0 for Windows was utilised.

RESULTS

Table 1: Distribution of patients according to GGI and GDM

Parameter	No. of Patients	Percentage
GGI	20	3.33
GDM	50	8.33
Normal	530	88.34
Total	600	100

The table above depicts the distribution of prenatal moms according on gestational glucose intolerance (GGI). Among 600 tested prenatal moms, 20 (3.33%) were found to be GGI positive, 50 (8.33%) were found to be GDM positive, and 530 (88.34%) were found to be OGTT negative.

Table 2: Distribution of patients according to gravid in GDM and GGI

Gravida	GGI	%	GDM	%
Primi	3	15	4	8
Multi	17	85	46	92
Trimester				
1st trimester	2	10	10	20
2nd trimester	10	50	32	64

3rd trimester	8	40	8	16

The table above illustrates the distribution of pregnant moms by gravida with GGI and GDM. The majority of prenatal moms were multigravida with GGI (85%) and GDM (92%). The difference between gravid and GGI and GDM prenatal women was not statistically significant (p>0.05). The majority of prenatal moms were in their second trimester, with GGI (50%) and GDM (64%). The difference between trimester and GGI and GDM antenatal women was not statistically significant (p>0.05).

Table 3: Distribution of patients according to age of GDM and GGI

Age	GGI	%	GDM	%	Total	%
below 20	0	0	3	6	3	4.28
25-25	2	10	4	8	6	8.57
25-30	10	50	24	48	34	48.57
30-35	3	15	10	20	13	18.57
above 35	5	25	9	18	14	25.71

The table above depicts the age distribution of pregnant moms with GGI and GDM. The majority of prenatal moms (50%) and GDM (48%), were between the ages of 25 -30. The difference in age between GGI and GDM prenatal moms was not statistically significant (p>0.05).

Table 4: Distribution of patients according to BMI

BMI	GGI	%	GDM	%	Total	%
<18.5	2	10	4	8	6	8.57
18.5-25	3	15	10	20	13	18.57
25-30	5	25	15	30	20	28.57
>30	10	50	21	42	31	44.29

The table above depicts the distribution of pregnant moms based on BMI with GGI and GDM. The majority of prenatal women (50%) and GDM (42%), had BMIs more than 30 kg/m2. When BMI was compared to GGI and GDM prenatal women, there was no statistically significant difference (p>0.05). The bulk of prenatal moms (40%) and GDM (38%), were from class I (Upper class). The difference between SES and GGI and GDM prenatal moms was not statistically significant (p>0.05).

Table 5: Distribution of patients according to high risk factor

High risk factor	GGI	%	GDM	%	Total	%
GDM in previous pregnancy	2	10	3	6	5	7.14
IUD	0	0	2	4	2	2.86
RPL/ early tri. Abortion	0	0	2	4	2	2.86
Macrosomic baby	2	10	3	6	5	7.14
Malformed baby	0	0	2	4	2	2.86

The table above depicts the distribution of prenatal moms based on high risk factors for GGI and GDM. GDM in prior pregnancy with GGI and GDM was reported in 2 (10%) and 3 (6%) cases with statistical significance, respectively. Only GDM prenatal moms (4%) had the IUD, which was statistically significant (P0.05). (P0.05) Only GDM prenatal moms (4%) had an early abortion and a deformed baby, which was statistically significant. (P<0.05).

Table 6: Distribution of patients according to Family history of DM

Family history of DM	GGI	%	GDM	%	Total	%
Positive	2	10	10	20	12	17.14
Negative	18	90	40	80	58	82.86

The table above depicts the distribution of prenatal moms based on a family history of DM with GGI and GDM. GGI prenatal moms had two (10%) family members with diabetes, but GDM antenatal mothers had ten (20%). When GGI and GDM prenatal moms were compared with DM family history, the difference was statistically significant (p0.05).

Two pregnant moms with GGI had a history of PIH, compared to two (4%) with GDM. When PIH history was compared to GGI and GDM prenatal moms, there was no statistically significant difference (p>0.05).

DISCUSSION

Pregnancy is a diabetogenic condition characterised by insulin resistance and hyperglycemia, and it has been linked to serious obstetric problems. According to numerous studies in America, Europe, and Asia, diabetes complicates 3-4% of pregnancies. Gestational diabetes has been on the rise in recent years, and it is reported to complicate pregnancies depending on the demographic. [13]

The trial recruited a total of 600 ANCs. The research was carried out following approval from the institutional ethical committee. The data was gathered using a pre-structured and pre-tested questionnaire. All socio-demographic information, as well as prior and current obstetric history, was gathered.

The distribution of prenatal mothers according to gravidity in the current research revealed that the majority 420 (70%) of the antenatal mothers were

multigravida, followed by 180 (30%) antenatal mothers who were primigravida. The distribution of pregnant moms by trimester revealed that the majority 300(50%) of prenatal mothers were in the third trimester, followed by the second trimester 210(35%) and the first trimester 90(15%).

In a research on screening for Gestational Diabetes Mellitus with 75gm OGTT conducted by Puttaraju CM et al, only 10% of the 500 individuals examined were primigravida, while 90% were multigravida.[16] In a research conducted by Gopalakrishnan V et al to test the efficacy of DIPSI-recommended OGTT in identifying GDM, it was discovered that out of 200 healthy pregnant women, 109 primi and 91 multigravid women.[17] The majority of GGI patients were found to have multigravida, according to gravida. (84.62%). [18]

In the current research, 20 (3.33%) of 600 screened prenatal moms were found to be GGI positive, 50 (8.33%) were found to be GDM positive, and 530 (88.34%) were found to be OGTT negative. Balaji V et al. found GGI in 2.6% of all tested women in a research on the incidence of gestational diabetes and delivery problems in 1042 pregnancies. Puttaraju CM et al found a 5.2% prevalence of GDM in a study on screening for Gestational Diabetes Mellitus with 75gm OGTT and its consequences on feto-maternal outcome. [16] In a research on the prevalence of Gestational Diabetes Mellitus in South India by V Seshiah et al, GDM was found in 392 (9.9%) of rural women. [19]

In a research on the prevalence of Gestational Diabetes Mellitus in the South by V Seshiah et al, the distribution of women in the age range 20-24years was substantially greater (66.4%) in rural regions. [19] In a research conducted by Balaji V et al to investigate the efficacy of DIPSI suggested OGTT in diagnosing GDM, 22 (11%) of 200 women tested positive for the DIPSI recommended 75 g OGTT. Only 5 positive (2.5%) instances were found using the ADA-recommended 75g OGTT. This suggested a population prevalence of 2.5%. [18]

The majority of prenatal moms were in their second trimester, with GGI (50%) and GDM (64%). The difference between trimester and GGI and GDM antenatal women was not statistically significant ($p>0.05$). In a research on the prevalence of Gestational Diabetes Mellitus in South Africa, V Seshiah et al found that 12.4% were diagnosed during 16 weeks of gestation, 23% between 17 and 23 weeks, and 64.6% were detected after 24 weeks. [19]

The majority of prenatal women (50%) and GDM (42%), had BMIs more than 30 kg/m2. When BMI was compared to GGI and GDM prenatal women, there was no statistically significant difference ($p>0.05$). Puttaraju CM et al found that 26.9% of GDM patients had a BMI of 30 kg/m2. 16 In a research on the prevalence of Gestational Diabetes Mellitus, V Seshiah et al found that women with a BMI of 25 kg/m2 had the greatest prevalence, with 28.4% in urban areas, 23.8% in semi-urban areas, and 16.1% in rural areas. [19]

Other research found an incidence of 15% at another government maternity facility linked with Madras Medical College in Chennai. This high frequency of GDM was reported in other regions of the nation as well, with 15% in Trivandrum, 21% in Alwaye, 12% in Bangalore, 18.8% in Erode, and 17.5% in Ludhiana. The total number of pregnant women examined at these facilities was 3674, with a GDM prevalence of 16.55%. This research found a clear upward trend in the prevalence of GDM, which was 2% in 1982 and 7.62% in 1991. This pattern is also seen in other nations. In Australia, for example, the frequency has more than quadrupled at one institution where the same testing technique and diagnostic criteria have been employed for more than two decades. [20]

GDM in prior pregnancy with GGI and GDM was reported in 2 (10%) and 3 (6%) cases with statistical significance, respectively. ($P<0.05$) Only 4% of GDM prenatal moms (4%) had an IUD, which was statistically significant. ($P<0.05$) Only GDM prenatal moms (4%) had an early abortion and a deformed baby, which was statistically significant. ($P<0.05$). Similar findings were seen in a study that compared gestational diabetic women to non-diabetic women in Asian Indian women. 82.3% of women who reported with GDM had a family history of diabetes in their first degree relatives, 2.7% of them had a history of abortion, 1.4% of their children showed congenital anomalies, 8.2% of them gave birth to low birth weight babies, and 27.6% of them gave birth to large babies in their previous pregnancy. [21]

GGI prenatal moms had two (10%) family members with diabetes, but GDM antenatal mothers had ten (20%). When GGI and GDM prenatal moms were compared with DM family history, the difference was statistically significant (p0.05). In a research by Puttaraju CM et al on screening for Gestational Diabetes Mellitus with 75gm OGTT and its impact on feto-maternal outcome, 61.53% of GDM patients had a positive family history of diabetes, compared to 9.91% of controls. Thus, family history is a large and statistically significant determinant in the prevalence of GDM. [16]

In the current research, pregnant moms with GGI had 2 (10%) PIH history compared to 2 (4%) in GDM. When PIH history was compared to GGI and GDM prenatal moms, there was no statistically significant difference ($p>0.05$). In a research on the interaction between gestational diabetes and pregnancy-induced hypertension (PIH), Zargar AH et colleagues discovered that PIH and GDM had no apparent correlation except for the mechanism of insulin resistance, which is evident in NIDDM owing to -cell dysfunction. [21]

Insulin resistance is a common component in both pregnancy-induced hypertension and gestational diabetes mellitus. Hyperglycemia causes a rise in

blood pressure as a result of insulin resistance, which prolongs the duration of hypertension. As a result, GDM may have a role in both the development and progression of PIH problems.

The rise in GDM prevalence in our sample might be related to greater BMI, since high maternal weight is linked with a significantly higher risk of GDM. The data from all three sites in our research indicated that women had a BMI of 30 kg/m2, confirming that increasing BMI is a risk factor for GDM. We found an increased incidence of GDM among less active women, which is similar to the findings of Dornhorst A, et al. [22]

CONCLUSION

The current research group had an 8.33% prevalence of Gestational Diabetes Mellitus. The rise in GDM prevalence in our sample might be linked to an increase in BMI, since high maternal weight is associated with a much increased risk of GDM. The growing incidence of Gestational Diabetes in the community, as well as the increased risk of pregnancy and delivery difficulties, warrants screening expecting women who frequent the prenatal clinic. The findings imply that all prenatal clinics should implement a programme of universal screening for GDM. This one-step process is straightforward, cost-effective, and practicable. It may be used for both screening and diagnosis at the same time. The OGTT is the best approach for detecting gestational diabetes mellitus in the high risk group because to its simplicity, acceptance, sensitivity, and cost efficiency.

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