



Fetomaternal Outcome in Pregnant Women with Abnormal OGTT in Tertiary Hospital: A Retrospective Cohort Study

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KEYWORDS

Gestational diabetes mellitus,

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ABSTRACT:

Introduction Gestational diabetes mellitus (GDM) is defined as glucose intolerance of variable degree with onset or first recognition during pregnancy. One fourth of the pregnant women in Asia and 3-35% pregnant women in India are affected by GDM. Uncontrolled GDM causes various maternal and foetal complications.

Objectives ▪ To know the incidence of GDM in pregnant women attending AIMSRC in OPD and IPD visits. ▪ To know the maternal and fetal outcome in pregnant women with abnormal OGTT.

Methods It is a retrospective observational study done among the 46 pregnant women with deranged OGTT levels over a period of 6 months These women were studied regarding antenatal complications, mode of delivery, post-natal complications, neonatal complications and neonatal outcome.

Results: In this study, we have studied 360 women. Among them, 46 (12.7%) women had abnormal OGTT readings. Out of them 11 (23.9%) had pre-eclampsia, 10 (21.7%) had UTI, 5 (10.8%) had abnormal labour, 11 (23.9%) had PPH. Whereas 20 (41.6%) of the neonates required NICU admissions, 17 (35.4%) had RDS, 2 (4.2%) had hypoglycaemia, 3 (6.2 %) had neonatal sepsis.

Conclusions: Pregnancies complicated with abnormal OGTT exhibit increased adverse maternal and foetal Complications as compared to non-complicated pregnancies. Women with abnormal OGTT benefit from close glucose monitoring and early initiation of treatment either with OHA or insulin administration.

1. Introduction

Gestational diabetes mellitus (GDM) is defined as glucose intolerance of variable degree with onset or first recognition during pregnancy.¹ Pregnancy inherently induces a diabetogenic state, increasing the risk of glucose regulation challenges. Almost one fourth of the pregnant women in Asia and 3.0-35.0% pregnant women in India are affected by GDM.² Uncontrolled GDM can lead to a range of complications for both the mother and the foetus, including pre-eclampsia, abnormal labour, and various neonatal complications. Nearly 50% of women with GDM will become overt diabetes (Type-2) over a period of 5 - 20 years.³

Infants born to moms with gestational diabetes mellitus are at an elevated risk for macrosomia, birth trauma, and shoulder dystocia.⁴⁻⁷ Post-delivery, these children have an

elevated risk of hypoglycaemia, hypocalcaemia, hyperbilirubinemia, respiratory distress syndrome, polycythaemia, and future obesity and type 2 diabetes.

Depending on geographical location and diagnostic methods used, the prevalence of GDM varied from 3.8% - 21% in different parts of India.⁸ As Asian ethnic background has been identified as a risk factor, and hence, screening should be offered to all pregnant women for GDM.⁹

Addressing GDM effectively is essential to improve pregnancy outcomes, highlighting the need for careful glucose monitoring and timely intervention. This study was conducted with the aim to evaluate the foeto-maternal outcomes in pregnant women with abnormal Oral Glucose Tolerance Test (OGTT) results in a tertiary hospital setting,



providing insights into the impact of GDM on pregnancy and neonatal health.

2. Objectives

- To know the incidence of GDM in pregnant women attending AIMSRC in OPD and IPD visits.
- To know the maternal and fetal outcome in pregnant women with abnormal OGTT.

3. Methods

This was a retrospective observational study conducted in a tertiary hospital in South India among pregnant women with abnormal OGTT results for a period of 6 months. A total of 360 pregnant women were studied. The study was initiated following the ethical approval from the institutional ethical committee. Being a record based observational study, informed consent was waived off for this project.

All pregnant women with abnormal OGTT results who received care at the study centre during the study period were included in the study. Pregnant women with pre-existing diabetes or other pre-existing metabolic conditions and those women with incomplete medical records or missing data during the study period were excluded from the study.

The data were collected retrospectively from the hospital records of pregnant women who underwent OGTT. The OGTT was conducted as per the hospital protocol to diagnose glucose intolerance during pregnancy. Medical records were reviewed to gather information on maternal outcomes including antenatal complications (e.g., pre-eclampsia, urinary tract infections), mode of delivery, and postnatal complications (e.g., postpartum haemorrhage). The neonatal outcomes studied were neonatal complications such as (e.g., respiratory distress syndrome, hypoglycaemia, neonatal sepsis) and NICU admissions. Data were analysed using descriptive statistics. The prevalence of various maternal and neonatal complications among women with abnormal OGTT was calculated and compared. The results were interpreted to determine the impact of abnormal OGTT on maternal and foetal outcomes

4. Results

The study included 46 pregnant women with abnormal Oral Glucose Tolerance Test (OGTT) results, accounting for

12.7% of the 360 women studied. Almost two third of the subjects belonged to the age group of 21 to 30 years (65.2%) and were multigravida (67.4%). There were 15.2% overweight and 13.1% obese individuals in this study. Little more than half of the participants i.e 56% were from urban background, but it is considerable to know that 44% were from rural population . Almost 90.0% booked their pregnancy the same hospital itself (Table 1).

Table 1: Sociodemographic characteristics of the study population

CHARACTERISTIC	VARIABLES	TOTAL, n (%)
Age (in years)	≤20	0
	21-30	30 (65.2)
	31-35	9 (19.6)
	≥36	7 (15.2)
Gravida	Primi	15 (32.6)
	Multi (2-4)	31 (67.4)
BMI (Kg/m ²)	Underweight (<18.5)	0
	Normal (18.5-24.9)	33 (71.7)
	Overweight (25-29.9)	7 (15.2)
	Obesity (≥30)	6 (13.1)
Residence	Urban	26 (56.5)
	Rural	20 (43.5)
Booked	At our hospital	41 (89.3)
	Outside	5 (10.9)



Figure 1: Graph representing age distribution of the study population

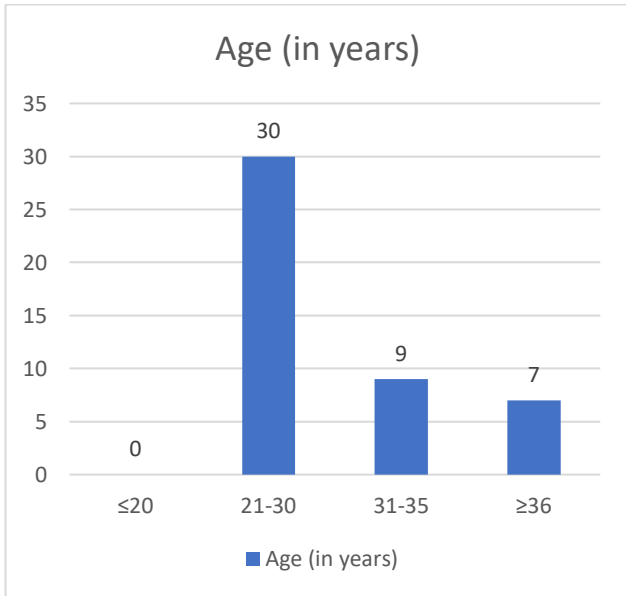


Figure 2: Graph representing gravida status of the study population

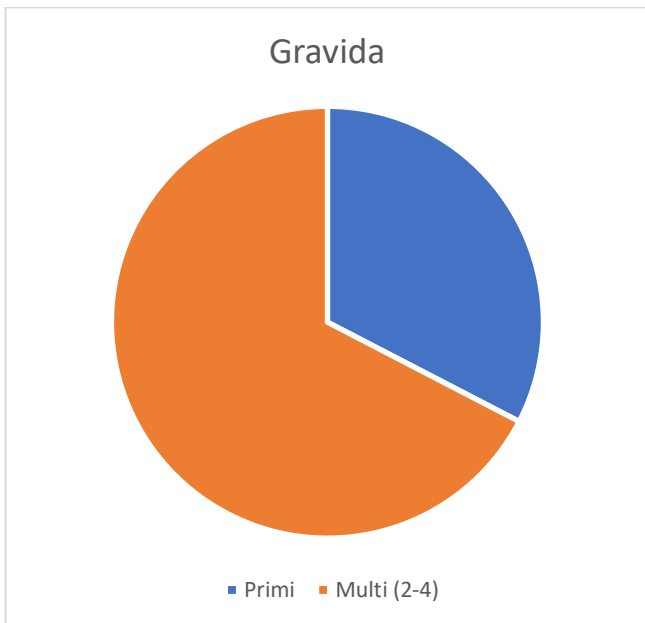


Figure 3: BMI of the study population

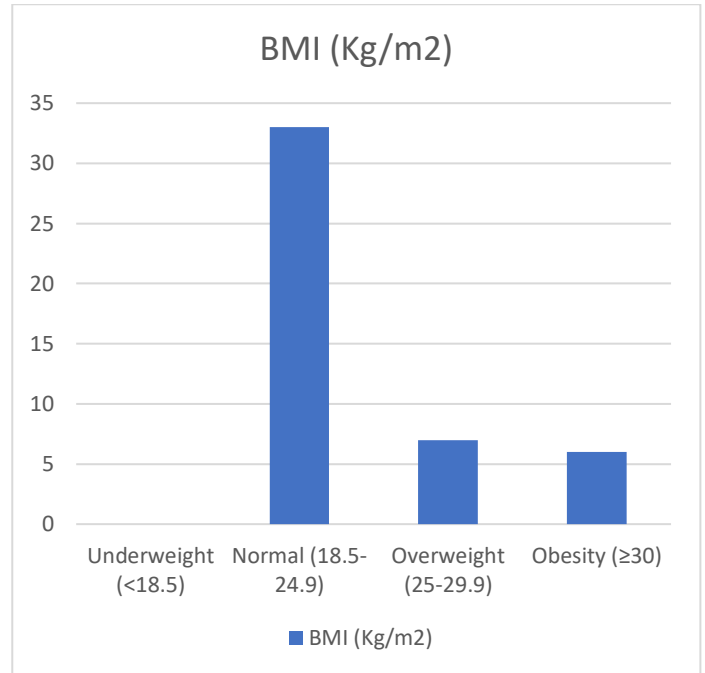


Figure 4: Residence of the study population

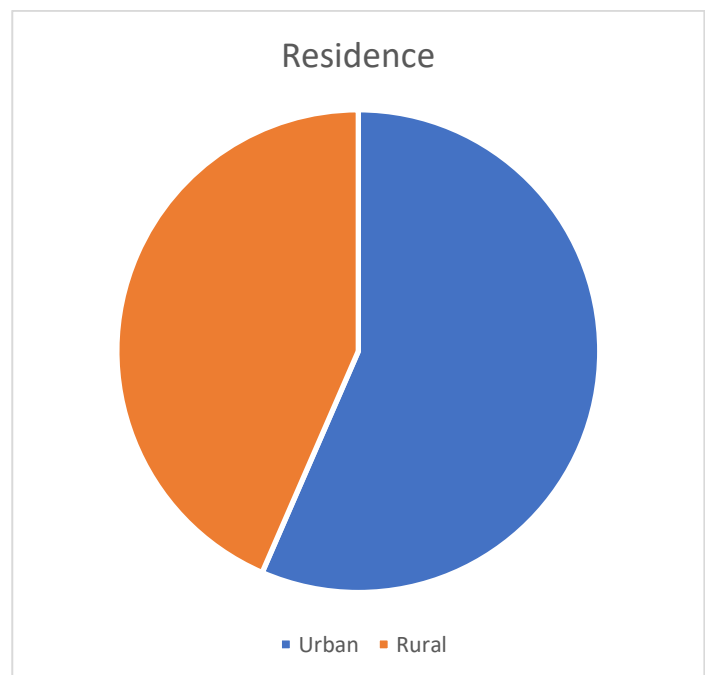
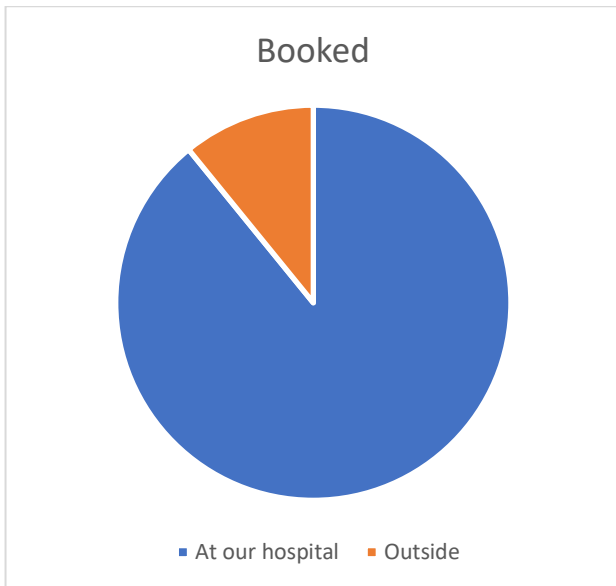


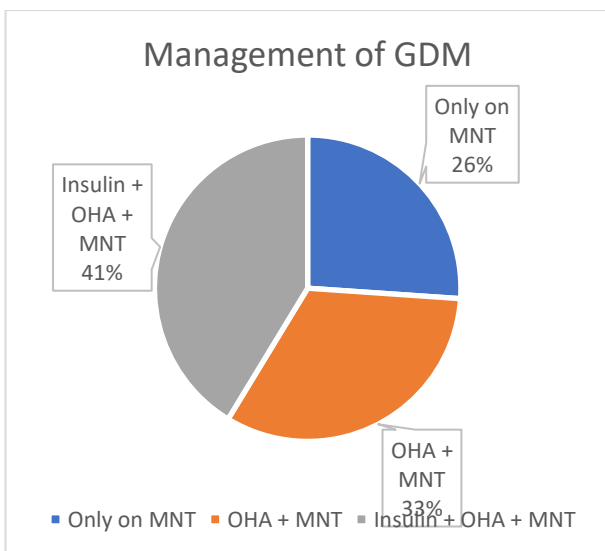


Figure 5: Booking status of the study population



In our study, out of the 46 cases, 39 (84.7%) had GDM, while 7 (15.2%) were diagnosed with overt diabetes. In this study it was found that 26.1% of the women managed their condition with Medical Nutrition Therapy (MNT) alone, 32.6% required a combination of Oral Hypoglycaemic Agents (OHA) and MNT, and 41.0% were treated with insulin along with OHA and MNT (Figure 1.0).

Figure 6: Management of GDM



The predominant method of delivery (76.0%) was Lower Segment Caesarean Section (LSCS), including 45.7% emergency LSCS and 30.3% elective LSCS. Merely 24.0%

experienced induced vaginal births. GDM was mostly identified between 24 and 34 weeks of gestation (71.73%), with 67.39% of the women delivering at or after 37 weeks. Singleton pregnancies constituted 95.65%, and twin conceptions represented 4.34%. (Table 2).

Table 2: Delivery outcomes in the study population

CHARACTERISTIC	TOTAL, n (%)
Family history of T2DM	9 (19.6)
Mode of delivery	
Vaginal delivery	11 (24.0)
Spontaneous vaginal delivery	3 (6.5)
Induced vaginal delivery	8 (17.5)
LSCS	35 (76.0)
Emergency LSCS	21 (45.7)
Elective LSCS	14 (30.3)
Number of gestations	
Singleton	44 (95.7)
Twins	2 (4.3)
Gestational age at which GDM was detected (in weeks)	
≤24	8 (17.4)
24-34	33 (71.7)
≥34	5 (10.9)
Gestational age at delivery (in weeks)	
≤34	3 (6.5)
34-37	12 (26.1)
≥37	31 (67.4)



Figure 7: Mode of delivery of the study population

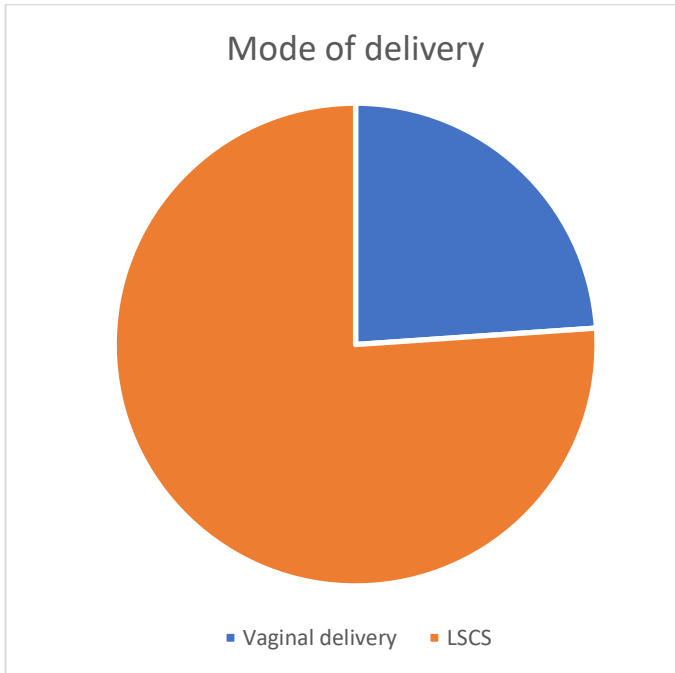


Figure 8: Number of gestations

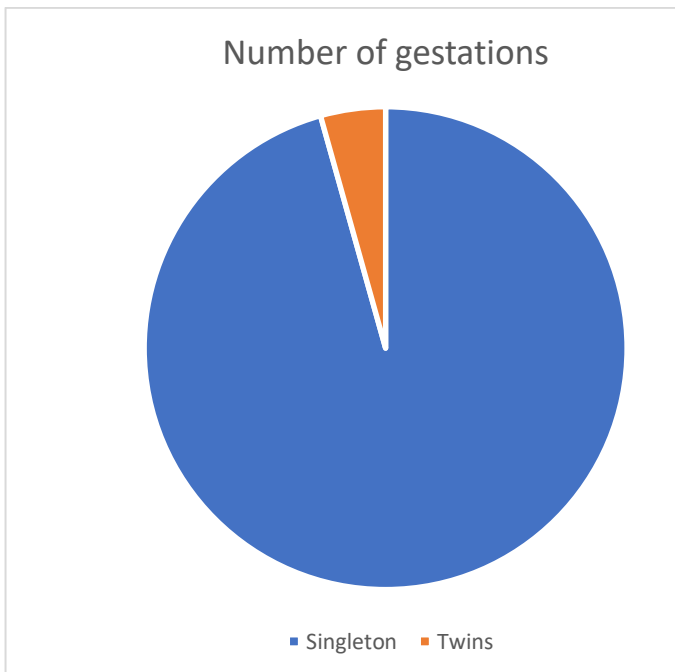


Figure 9: Gestational age at which GDM was detected (in weeks)

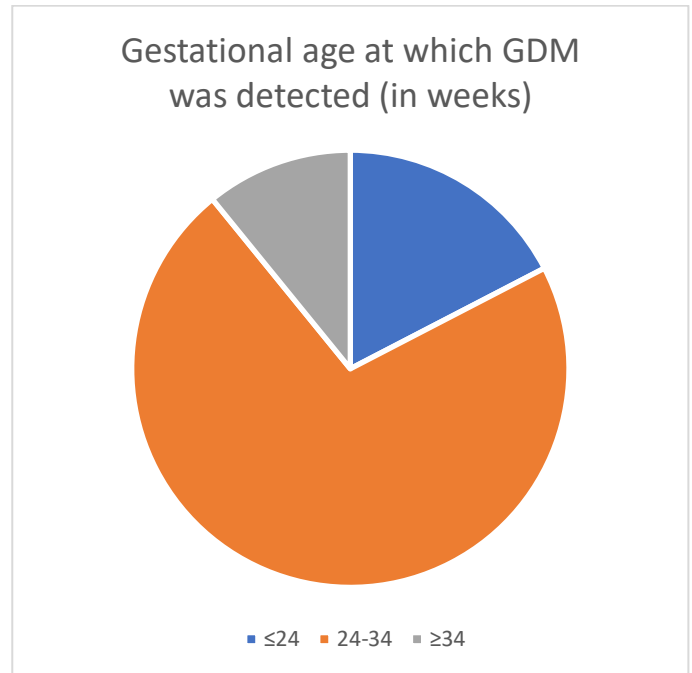
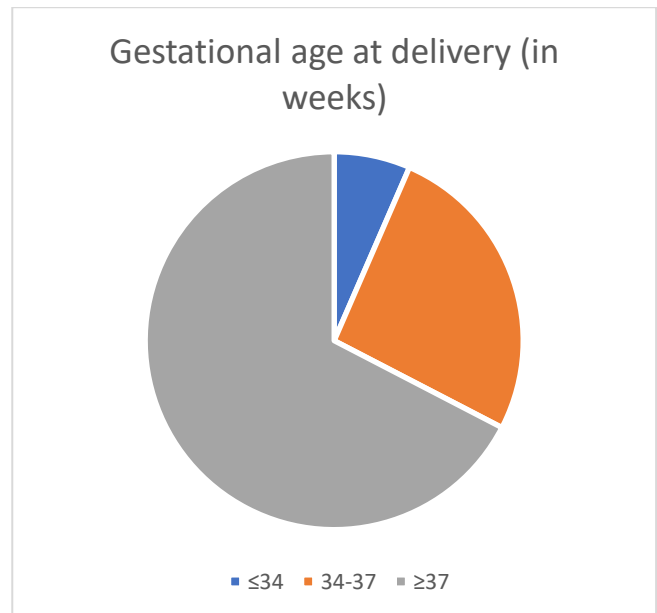


Figure 10: Gestational age at delivery (in weeks)



In this study, polyhydramnios was seen among 5 subjects (10.9%) with three having mild (6.5%) and one each having moderate and severe polyhydramnios respectively (2.2% each). Oligohydramnios was present among six of the study participants (13.0%). There were a total of two perinatal mortalities (4.3%) in this study. It was observed that, 21.7% of the subjects had malpresentation. Also in this study, 23.9% of the women had pre-eclampsia, whereas 6.5%

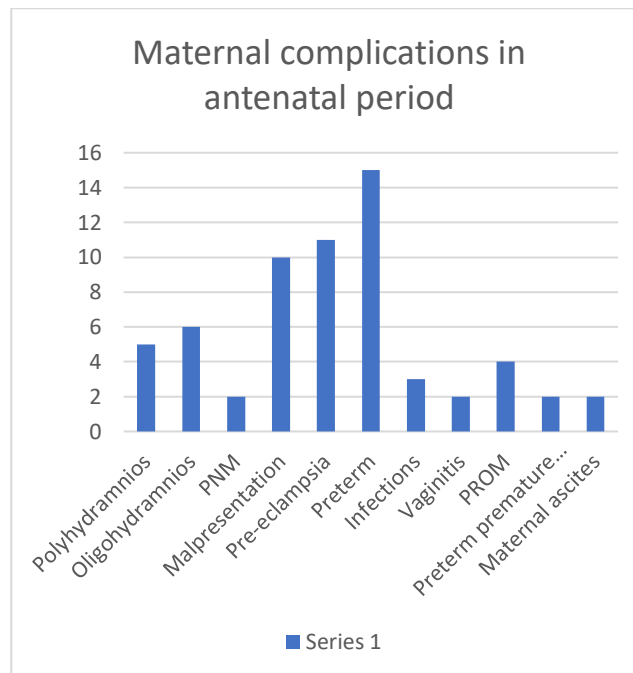


suffered from infections. Vaginitis was seen among 4.3% of the study participants. In this study we also observed that 8.7% of the study subjects had PROM while 4.3% had preterm premature rupture of membranes. Maternal ascites was seen among 4.3% of the study participants (Table 3).

Table 3: Distribution of maternal complications in antenatal period

MATERNAL COMPLICATIONS	TOTAL, n (%)
Antenatal period	
Polyhydramnios	5 (10.9)
Mild	3 (6.5)
Moderate	1 (2.2)
Severe	1 (2.2)
Oligohydramnios	6 (13.0)
Perinatal mortality	2 (4.3)
Malpresentation	10 (21.7)
Pre-eclampsia	11 (23.9)
Preterm	15 (32.6)
Infections	3 (6.5)
Vaginitis	2 (4.3)
PROM	4 (8.7)
Preterm premature rupture of membranes	2 (4.3)
Maternal ascites	2 (4.3)

Figure 11: Maternal complications in antenatal period



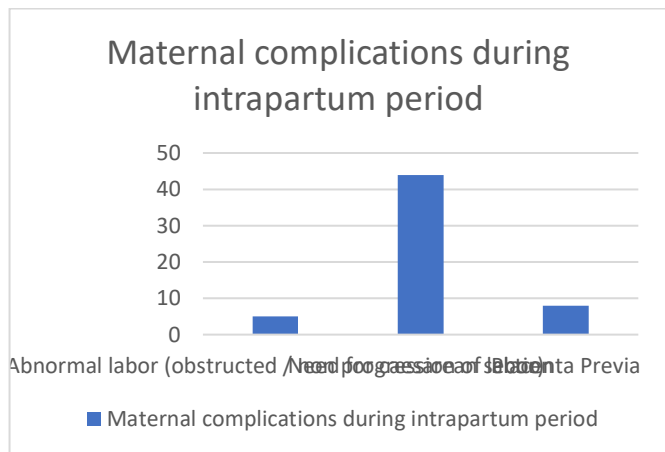
Considering the intrapartum complications, LSCS was needed for almost 76% of the study participants, abnormal labour was seen in 5 subjects (10.8%) and placenta previa was seen among 8 study subjects (17.4%).

Table 4: Distribution of maternal complications during intrapartum period

MATERNAL COMPLICATIONS	TOTAL, n (%)
Intrapartum period	
Abnormal labor (obstructed / non progression of labor)	5 (10.8)
Need for caesarean section	44 (95.7)
Placenta Previa	8 (17.4)



Figure 12: Maternal complications during intrapartum period



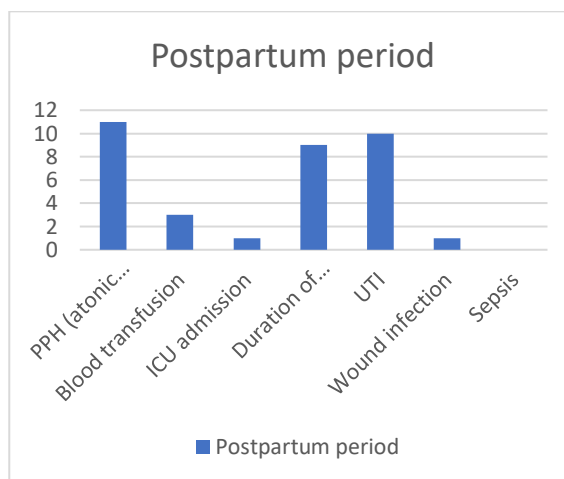
In this study 11 (23.9%) of the study participants had PPH because of atonic uterus, three (6.5%) of the them had to undergo blood transfusion and one subject (2.2%) required ICU admission. Prolonged hospital stay (> 7 days) were seen among 19.6% of the study participants. Urinary tract infection following delivery were seen among 10 (21.7%) of the study participants. Wound infection was seen among one subject (2.2%), while none of the study subjects had sepsis in this study.

Table 5: Distribution of maternal complications during postpartum period

MATERNAL COMPLICATIONS	TOTAL, n (%)
Postpartum period	
PPH (atonic uterus)	11 (23.9)
Blood transfusion	3 (6.5)
ICU admission	1 (2.2)
Duration of hospital stay > 7 days	9 (19.6)
UTI	10 (21.7)
Wound infection	1 (2.2)

Sepsis	0 (0.0)
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Figure 13: Maternal complications at postpartum period



In this study 64.6% of newborns had a birth weight ranging from 2.5 to 3.5 kg, whilst 20.8% weighed between 1.5 and 2.4 kg. Also, 12.5% had birthweight more than 3.5 kg, while one subject had birth weight less than 1.5kg. In our study, 41.6% of newborns necessitated NICU hospitalization that's accounting for 11 (22.9) being admitted for less than 7 days and 9 (18.7%) for >7 days. 8.3% of newborns had an Apgar score below 7 at 1 minute, whereas 2.1% did so at 5 minutes. Among the neonates five (10.4%) required intubation due to respiratory distress (Table 6).

Table 6: Distribution of neonatal outcomes

CHARACTERISTIC	TOTAL, n (%)
Outcome of delivery	
Live	46 (95.8)
PNM	2 (4.2)
Birthweight (in Kg)	
<1.5	1 (2.1)
1.5-2.4	10 (20.8)
2.5-3.5	31 (64.6)



≥3.5	6 (12.5)
APGAR (<7)	
@1min	4 (8.3)
@5min	1 (2.1)
NICU admission	
Yes	20 (41.6)
No	26 (54.1)
Duration of NICU stay (in days)	
≤7	11 (22.9)
>7	9 (18.7)
Status of neonate at discharge	
Alive	46 (95.8)
Dead	2 (4.2)

Figure 16: Distribution of Apgar score <7

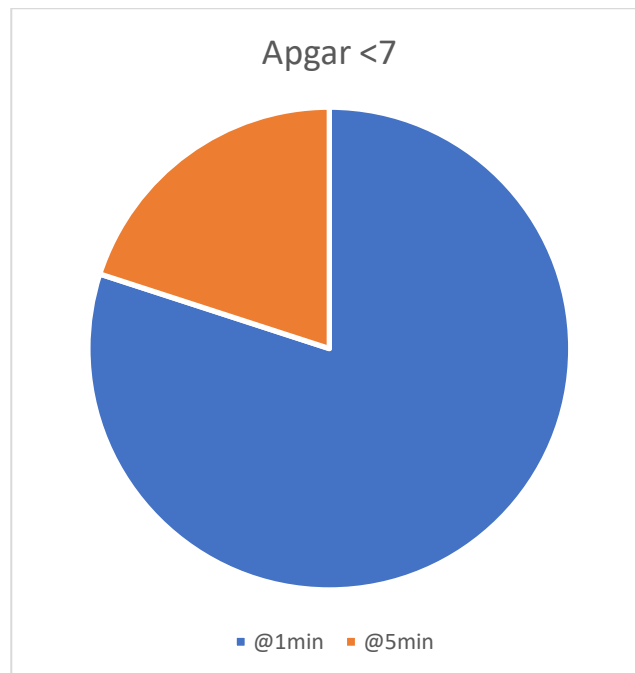


Figure 17: NICU admission

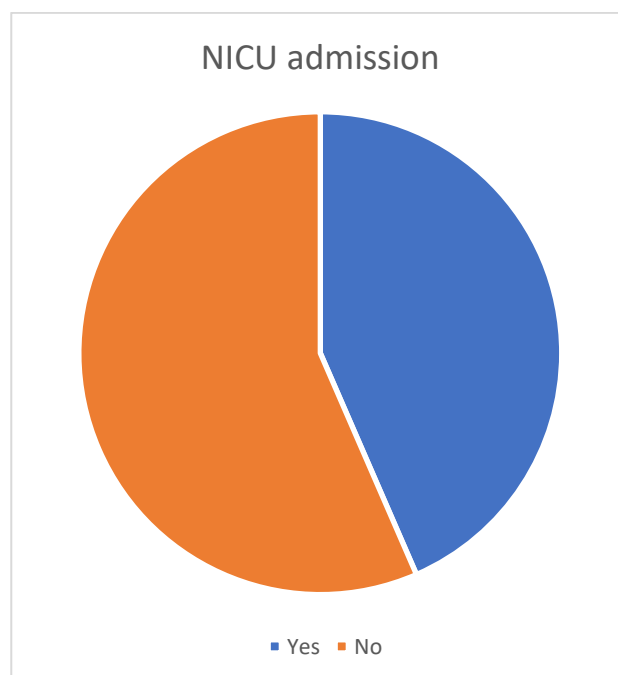


Figure 15: Distribution of birthweight

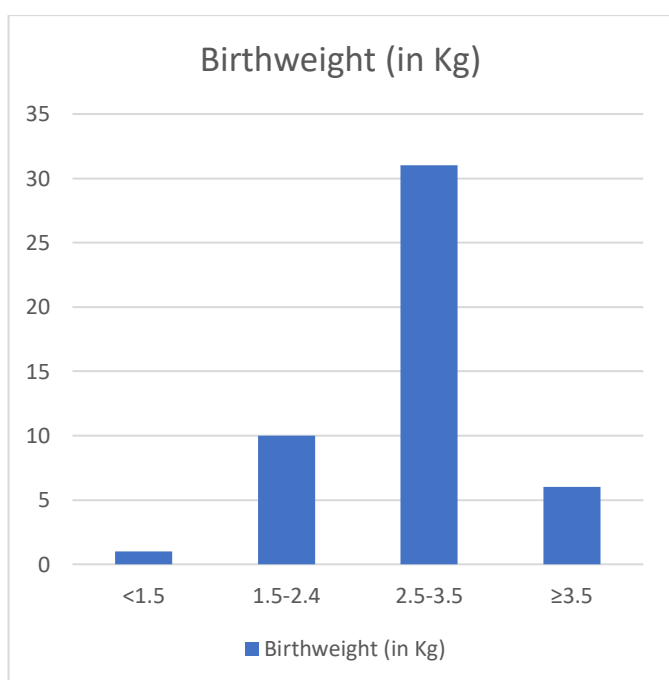




Figure 18: Duration of NICU stay (in days)

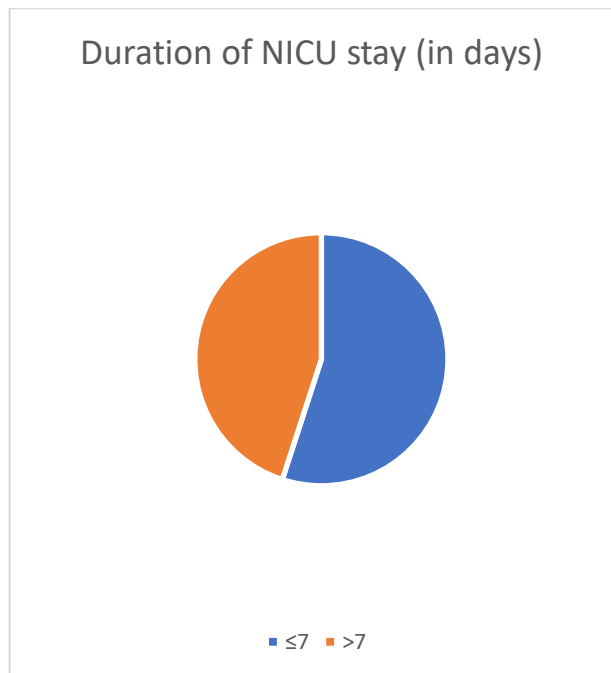
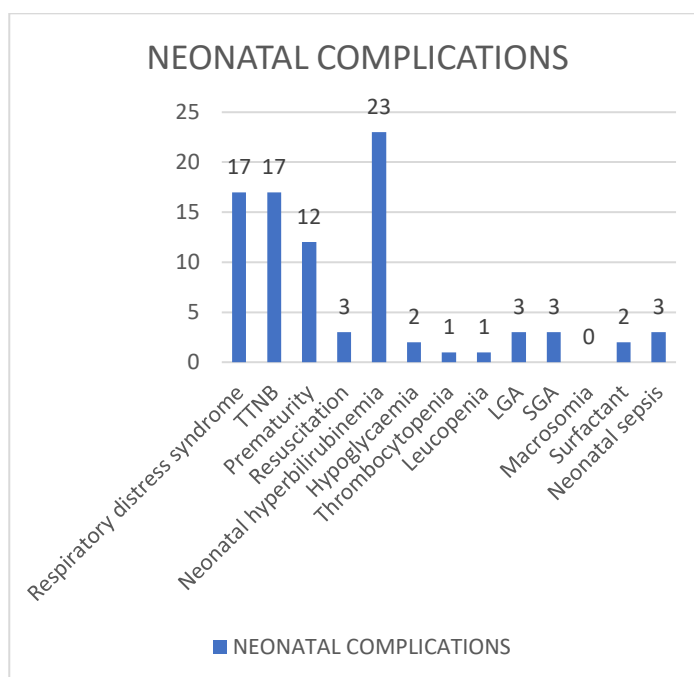


Table 7: Distribution of neonatal complications

NEONATAL COMPLICATIONS	TOTAL, n (%)
Respiratory distress syndrome	17 (35.4)
TTNB	17 (35.4)
Prematurity	12 (25.0)
Resuscitation	3 (6.3)
Neonatal hyperbilirubinemia	23 (47.9)
Hypoglycaemia	2 (4.2)
Thrombocytopenia	1 (2.1)
Leucopenia	1 (2.1)
LGA	3 (6.3)
SGA	3 (6.3)
Macrosomia	0 (0.0)

Surfactant	2 (4.2)
Neonatal sepsis	3 (6.3)

Figure 20: Neonatal complications



The predominant complications were respiratory distress syndrome (35.4%) and transient tachypnoea of the newborn (35.4%). Neonatal hyperbilirubinemia occurred in 47.9% of cases, whilst hypoglycaemia was seen in 4.2% (Table 7). We encountered 2 perinatal mortalities, one died on day2 due to extreme prematurity & related complications, other died on day6 due to pulmonary haemorrhage and hypovolemic shock.

5. Discussion

This research was conducted at a tertiary hospital in rural Bangalore to identify instances of OGTT abnormalities, diagnosing gestational diabetes mellitus and its impact on obstetric and foetal outcomes. In this study, we had studied 360 antenatal women. Among them, 46 (12.7%) women had abnormal OGTT readings.

Almost two third of the subjects belonged to the age group of 21 to 30 years in this study. In the study conducted by Sajani et al., mothers aged more than 25 years were mostly



affected with GDM.¹⁰ In the Farooq et al., study majority of the study subjects were above 25 years of age.¹¹

In this study abnormal OGTT readings were observed more in multigravida. In the Sajani et al., study most of the mothers were multigravida.¹⁰ Kumari et al., also showed similar results with multigravida mothers constituting the major population with increased incidence of GDM.¹² Women with higher gravida status tend to be older compared to primigravida. The stress on Beta cells of pancreas increases so does the insulin resistance, hence, the incidence of GDM rises with parity.

Overweight and obese individuals constituted almost one fourth of the study population in this study. Overweight and obesity are factors associated with increased chance of T2DM as well as gestational diabetes mellitus.¹³ Little more than half of the participants were from urban background and almost 90.0% booked their pregnancy the same hospital itself.

In this investigation, during the antenatal period, polyhydramnios and oligohydramnios together were seen among one-fourth of the study population. This research included two perinatal mortalities. It was noted that one-fifth of the subjects had malpresentation. In this research, one-fourth of the women had pre-eclampsia. Vaginitis was seen in 4.3% of the research subjects. This research revealed that 8.7% of the participants had PROM, whereas 4.3% had preterm premature rupture of membranes. Maternal ascites was seen in 4.3% of the research participants. In the study by Akhter et al., patients with GDM had almost similar antenatal complications like preeclampsia, polyhydramnios, hypothyroidism, preterm labour, and IUGR.¹⁴ In the study conducted by Dahiya et al., it was observed that, women with GDM had higher proportion of obstetric complications including polyhydramnios, pre-eclampsia, IUGR, intrauterine death, preterm labour, preeclampsia and congenital malformation of foetus compared to women without GDM.¹⁵ In the study conducted by Kumari et al., the predominant consequence linked to gestational diabetes mellitus (GDM) was abortion, followed by preeclampsia, and infections, mostly vulvovaginal candidiasis. PROM, polyhydramnios and hypothyroidism were also observed. Recurrent pregnancy losses, UTI, and polycystic ovarian disease (PCOD) were also common among the study participants in the same study. In the study conducted by Joy et al., one fourth of the

women had pregnancy induced hypertension and few other women had hypothyroidism.

The predominant method of delivery was LSCS in our study, including both emergency LSCS and elective LSCS. Only few experienced induced vaginal births. In the study by Akhter et al., 3/4 of the patients having GDM delivered by caesarean section and one fourth delivered by normal delivery.¹⁴ Many studies have found high caesarean delivery rates in GDM patients despite good maternal blood glucose control during pregnancy.^{16,17} Joy et al., found most of women underwent caesarean delivery.¹⁸ According to Kale et al., the incidence of caesarean section in patients with GDM was found to be more compared to normal vaginal delivery¹⁹

Abnormal labour and placenta previa were seen among of the study population. In this research, postpartum haemorrhage due to atonic uterus was present among one fourth of the study participants, three participants needed blood transfusion, and one patient necessitated ICU stay. Prolonged hospital stays exceeding seven days were seen in one fifth of the research subjects. Urinary tract infections post-delivery were also seen many of the research subjects. Wound infection occurred in one person, however none of the trial participants had sepsis. In the study conducted by Akhter et al., PPH occurred in only a few of the study participants and three subjects had wound infection

Table 8: Comparison with other studies

	MY STUDY 2024	Kumari et al., 2016	SN Chaudhri et al., 2020
Prevalence	12.7%	0.94%	12.5%
Most Common Age Group	21 to 30 = 65%	25-30 = 50%	20 to 25 = 80%
	31 to 35 = 19%		
	≥36 = 15%		
Gravida	Multi = 67%	Multi = 63%	Multi = 56%
	Primi = 32%	Primi = 37%	Primi = 44%
BMI	18 to 25 = 71%	20 to 30 = 31 %	18 to 25 = 76%



	25-29.9= 15.2% >30= 13%	>30 = 69 %	
GDM Management	Insulin +OHA= 41.03%		Insulin +OHA= 72%
	OHA= 32.6%		OHA = 12%
	Diet = 26.08%		Diet = 16%
Preeclampsia	24%	21.45%	12%
Polyhydramnios	11%	10.70%	
UTI	21%	7.10%	
Vaginal Delivery	24%	63%	68%
LSCS	76%	27%	32%
Still Birth		3.50%	
Early Neonatal DEATH	4.16%	4.70%	
NICU Admission	41.60%	34%	28%
LOW APGAR	8%	10%	8%
RDS	35%	3.50%	
Hypoglycaemia	4%	14%	8%
Hyperbilirubinemia	47%	5.90%	
Macrosomia			4%
Preterm	25%		12%

In this study it was found that one fourth of the women managed their condition with diet or MNT alone, one third required a combination of OHAs and MNT, and most of them were treated with insulin along with OHA and MNT. In the study conducted by Akhter et al, most of the GDM mothers were treated with insulin therapy, while others received both diet restriction and insulin therapy.¹⁴

In our study less than half of the neonates required NICU admissions, because of RDS, hypoglycaemia, and neonatal

sepsis. In the Akhter et al., study the complications identified were neonatal hyperbilirubinemia, then respiratory distress and hypoglycaemia, meconium aspiration syndrome, and neonatal sepsis.¹⁴

In our study males were more prone for respiratory distress compared to females. It is analogous to the research done by Townsel et al., which likewise indicated a higher prevalence of RDS among boys compared to girls. It affirms that male infants should be meticulously observed for postnatal outcomes.²⁰

Chavan et al., demonstrated that lower segment caesarean section (LSCS) was the predominant cause for respiratory distress, in contrast to normal vaginal birth. Our research indicated that LSCS was the predominant cause for respiratory distress, in contrast to normal vaginal birth. To alleviate respiratory discomfort, normal vaginal delivery should be performed more often.²¹

Research by Maria Bulimba et al., indicated that most of infants required CPAP assistance, while the rest used nasal prongs. This contrasts with our findings, where half of infants received oxygen support via prongs and others were administered CPAP. It indicates that the majority of the infants need both CPAP and prongs.

CONCLUSION

Pregnancies with abnormal oral glucose tolerance test (OGTT) results are associated with a higher incidence of adverse maternal and fetal outcomes. This underscores the need for rigorous implementation of universal screening protocols and enhanced maternal education to improve awareness and early detection. Women diagnosed with abnormal OGTT benefit from meticulous glycaemic monitoring and the prompt initiation of therapy—including medical nutrition therapy (MNT), oral hypoglycaemic agents, or insulin—which collectively contribute to improved fetomaternal outcomes.

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