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Comparison of Gdm and Non-Dm Women's Medical Profiles and Pregnancy-Related Outcomes

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Abstract
Background: *The impaired glucose tolerance known as gestational diabetes mellitus (GDM) was initially identified in pregnant women. The purpose of this study is to assess and contrast the clinical state and pregnancy outcomes of women with and without GDM.*
Materials and Methods: *Pregnant patients with and without GDM who received prenatal treatment at Jashore Medical College Hospital, Jashore, Bangladesh, between June 2021 and May 2022 were included in a retrospective cohort analysis. Clinical information was gathered, such as the mother's age, parity, gestational age at diagnosis, and delivery method. Assessments of pregnancy outcomes were conducted, including but not limited to maternal problems, hypertension, neonatal birth weight, incidence of macrosomia, and other pertinent characteristics.*
Results: *The analysis comprised 214 pregnant women, of whom 129 did not have a GDM diagnosis and 85 had one. Pregnancy outcomes analysis showed that the GDM group had a greater rate of cesarean section deliveries. Additionally, there was an increased risk of neonatal problems for babies born to moms with GDM.*
Conclusion: *Pregnancy outcomes that were unfavorable were more common in women with GDM diagnosis, who also had unique clinical features. These results emphasize how crucial it is to closely monitor and effectively manage pregnant GDM patients in order to maximize the health of both the mother and the newborn.*
Keywords: *Gestational diabetes, Pregnancy outcome, Maternal complication, Neonatal complication*

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I. Introduction

Any degree of glucose intolerance that first manifests during pregnancy is referred to as "gestational diabetes mellitus," or GDM. Between 1 and 14% of people have GDM on any one day [1]. Body mass index (BMI) >30 kg/m^2, a first-degree relative's family history of diabetes mellitus, a previous history of GDM, and Middle Eastern or Asian ancestry are among the risk factors for GDM, albeit their prevalence varies by demographic[2] . The International Diabetes Federation estimates that one in six pregnancies result in maternal dysglycemia; 84% of these pregnancies are diagnosed with GDM, and 16% have pregestational established diabetes[3]. There is a correlation between GDM and unfavorable pregnancies, according to several noteworthy observational studies [4,5].

Among the diseases that impact the infant include large for gestational age (LGA), macrosomia, hypoglycemia, and the necessity for therapy in a neonatal intensive care unit (NICU). These include an increase in hypertensive issues and surgical deliveries for the mother. Long after the baby is delivered, the mother and child are still impacted by GDM. The most recent cohort follow-up research indicates that the impact on the long-term maternal glycaemic status and long-term glycaemic status transfers the obesity phenotype in the offspring [6, 7]. Numerous difficulties from GDM affect both the mother and the unborn child, even with well-developed antenatal care services, highlighting the significant burden that GDM places on patients, their families, and healthcare systems [8, 9]. Early detection of gestational diabetes mellitus (GDM) in high-risk mothers provides an opportunity to act earlier and enhance outcomes for both the mother and the baby[10].

An extensive retrospective research of an Australian cohort found that women with GDM diagnosed before 12 weeks of pregnancy had worse pregnancy outcomes compared to women diagnosed between 24 and

28 weeks of pregnancy, and similar pregnancy outcomes to women with pre-existing diabetes[11]. Preterm labor and cesarean sections (CS) were more common in those with early GDM, according to a demographic analysis conducted in the Middle East[12]. A study found that women in South Asia with a history of GDM had a high incidence of DM, with substantial geographical differences. Bangladeshi women showed significantly higher rates of diabetes mellitus (DM) despite being much younger. This could be explained by their significantly higher pregnancy rates, family history of diabetes, and status as overweight/obesity[13]. Comparing the clinical conditions of maternal and newborn outcomes in pregnancies between the GDM and non-GDM groups was the purpose of this study.

II. Methods and Materials

Retrospective cohort design was used in this study, which involved pregnant women at Jashore Medical College Hospital in Jashore, Bangladesh, who were in their third trimester between June 2021 and May 2022. Maternal demographics, glycemic management strategies, and neonatal and maternal outcomes were among the information gathered from medical records. 214 pregnant women participated in the study; all diagnosed selected instances of GDM were assigned to group A=85, whereas selected cases without GDM were assigned to group B=129.

Women who might have an impact on the outcome of their pregnancy, such as those with anemia, asthma, epilepsy, pre-pregnancy hypertension (PIH), thyroid dysfunction, or cardiac issues, were not allowed to participate.

Because diagnosed pregnant women with GDM in the first trimester are regarded to have Type 2 DM, pregnant women who were known to have diabetes mellitus prior to becoming pregnant or who had unknown pre-pregnancy diabetes status were also excluded.

Maternal age, blood pressure readings, glucose monitoring logs, gestational age, delivery mode, neonatal birth weight, Apgar scores, and rates of admission to the neonatal intensive care unit (NICU) were among the data covered.

III. Results

The study involved a total of 214 participants, all of whom were married. Among them, (group A=85) were diagnosed with GDM, while the majority, (group B=129) did not have GDM. Maximum patients were found under the age range of 20-30.

Age	Group A	Group B
<20	8	20
20-30	45	80
>30-32	32	29
All participants were married		

Table 1: Distribution of the participants' age

In terms of parity, for those with three or more pregnancies found higher chance of GDM. However, for those with 1-2 previous pregnancies had higher rate of non GDM history. The participants were also analyzed based on gestation week, our study groups dominated the range of 29-36 gestation weeks for both GDM and non GDM. Only, three patients required irregular antenatal care.

Parity	Group A	Group B
0	15	36
1-2	27	68
≥3	43	25
Gestation week	**Group A**	**Group B**
<28	7	29
29-36	46	66
>37	32	34
3 patients required irregular antenatal care		

Table 2 Distribution of parity and gestational week of the participants

Regarding the mode of delivery, the majority of participants underwent Lower Segment Cesarean Section (LSCS), with 69 cases. Normal Vaginal Delivery (NVD) occurred in maximum (145) cases, and 7 participants underwent other procedures such as peripartum hysterectomy due to previous cesarean section with placenta previa with morbid adherent of placenta.

Mode of Delivery	Frequency	Percentage
LSCS	69	28
NVD	145	69
Peripartum hysterectomy (due to previous cesarean section with placenta previa)	7	3

Table 3: Delivery mode of the patients

The maternal complications examined in this study include Preeclampsia (prominent), Placental Abruption, Placental Previa, Intrauterine Growth Restriction, Polyhydramnios, and Anemia. The following table underscores the differences in the prevalence of these complications between the two groups, shedding light on potential associations between GDM and specific maternal health challenges during pregnancy.

Maternal Complications	Group A	Percentage	Group B	Percentage
Preeclampsia	20	45.45	46	47.42
Placental abruption	02	4.54	12	12.37
Placental Previa	08	18.18	05	5.15
Large for gestational age	07	15.9	11	11.34
Polyhydramnios	03	6.81	17	17.53
Anemia	04	9.09	06	6.19
No complication	41	48.23	32	24.8

Table 4: Pregnancy related complication among the patients

The table 5 presents the outcomes of pregnancies among two distinct groups, Group A and Group B. In Group A, 75 out of 85 resulted in live births, whereas, Group B indicates 121 live birth out of 129 participants.

Maternal Outcome	Group A	Percentage	Group B	Percentage
Live birth	75	89.47	121	97.94
Early neonatal death (END)	02	2.10	02	0.51
Stillbirth (Fresh+ Macerated)	07	7.36	04	1.02
Perinatal death (END+ Stillbirth)	01	1.05	02	0.51

Table 5: Outcome of pregnancies among the study participants

The data presented in Table 6 provides insights into the distribution of hypertension types, duration of hypertension, and familial hypertension status among the study groups. This data demonstrates family history has impact on GDM. Hypertension and GDM often coexist during pregnancy. Women with GDM have an increased risk of developing hypertension, and vice versa, leading to potential complications that require careful monitoring and management for maternal and fetal well-being.

Hypertension type	Frequency	Percentage
Primary	49	10.12
Secondary	24	4.96
Duration of Hypertension		
<1 year	53	10.95
1-3	11	2.27
4-7	7	1.45
>7	2	0.41
Familial hypertension		
Yes	55	11.36
No	18	3.72

Table 6: Hypertension status among the study groups

In Table 7, the occurrences of various complications are detailed for two groups, Group A and Group B. Maximum neonates were out of complication however, jaundice and respiratory distress were recorded for both the group which is significant.

Neonatal Complications	Group A	Percentage	Group B	Percentage
Jaundice	10	10.52	18	4.62
Septicemia	2	2.10	1	0.26
Respiratory distress	15	15.79	13	3.34
Neonatal convulsion	3	3.16	3	0.77
No complication	55	68.42	94	91.00

Table 7: Complications among live birth neonates

Table 8 outlines the distribution of neonatal birth weights, maximum neonates in between the 2501-4000g. Additionally, 14 neonates required admission to the Neonatal Intensive Care Unit (NICU), and 2 were diagnosed with congenital anomalies.

Neonatal birth weight (gm)	Frequency	Percentage
≥ 4001	12	2.48
2501- 4000	91	90.15
1501- 2500	21	4.33
1000- 1500	4	0.83
≤ 1000	1	0.20
NICU required = 14 Congenital Anomalies = 2		

Table 8: Birth weight variations among the neonates

IV. Discussion

There were 214 married participants in the study. Out of them, 129 did not have GDM, and 85 had the diagnosis. Eight GDM and twenty non-GDM participants were under 20, 45 GDM and 80 non-GDM participants were between 20 - 30, and 32 GDM and 29 non-GDM participants were ≥30- 32 range. Regarding parity, out of 36 participants who were not diagnosed with GDM, 15 GDM participants had never given birth before. However, 27 people with GDM and 68 people without GDM had one or two prior pregnancies. Again, 43 people with three or more pregnancies had GDM, and 25 had non-GDM. In addition, the participants' gestation weeks were examined. Of these, 7 GDM and 29 non-GDM participants had gestations shorter than 28 weeks, 46 GDM and 66 non-GDM participants fell between 29 and 36 weeks, and 32 GDM and 34 non-GDM participants had gestations longer than 37 weeks.

The mode of delivery in the study population, with the majority undergoing Normal Vaginal Delivery (NVD), was 69%, but Lower Segment Caesarean Section (LSCS) accounted for 28%. A small percentage, 3%, represents other modes, primarily involving peripartum hysterectomy due to previous cesarean section with placenta previa with morbid adherent of placenta. This distribution underscores the prevalence of cesarean sections, possibly influenced by GDM. It emphasizes the diverse methods employed in childbirth, with LSCS emerging as the dominant mode. It warrants further exploration into factors influencing delivery choices and potential implications for maternal and neonatal health.

Maternal complications associated with GDM and non-GDM increase the risk of various adverse outcomes during pregnancy. Preeclampsia appears notably elevated in both groups, with 45.45% in group A and 47.42% in group B. Placental abruption, Placental Previa, and Large for gestational age also exhibit higher percentages among GDM patients. Polyhydramnios shows a significant increase from 6.81% to 17.53%. Anemia, although present, demonstrates a relatively lower percentage shift.

The study data compared maternal outcomes between women with GDM and non-GDM. Among women with GDM, 89.47% experienced live births, while 2.10% had early neonatal deaths and 7.36% experienced stillbirths. The overall perinatal death rate (combining early neonatal deaths and stillbirths) was 1.05%. In contrast, non-GDM women had higher percentages of live births (97.94%), with lower rates of early neonatal deaths (0.51%) and stillbirths (1.03%). The overall perinatal death rate for non-GDM women was 0.51%. These findings highlight potential differences in maternal outcomes associated with GDM.

Among the participants, 10.12% exhibited primary hypertension, while 4.96% had secondary hypertension. In terms of duration, 10.95% reported having hypertension for less than a year, with decreasing percentages for longer durations. Familial hypertension was prevalent in 11.36% of cases. The data provides a snapshot of hypertension characteristics within the studied group. However, additional information on the relationship between hypertension and gestational diabetes mellitus (GDM) is mentioned but not detailed, leaving room for further exploration of the interplay between these health conditions.

Among 85 GDM cases, jaundice was reported in 10.52%, septicemia in 2.10%, respiratory distress in 15.79%, and neonatal convulsions in 3.16%. In contrast, the non-GDM group (n=129) showed lower percentages for these complications—jaundice (4.62%), septicemia (0.26%), respiratory distress (3.34%), and neonatal convulsions (0.77%). Notably, 68.42% of GDM births had no complications, which was higher at

91.00% in the non-GDM group. Additionally, the distribution of neonatal birth weight revealed that most cases fell within the 2501-4000 gm range (92.15%). The need for Neonatal Intensive Care Unit (NICU) care was indicated in 14 patients, and congenital anomalies were reported in 2 cases. These findings underscore the impact of GDM on neonatal outcomes, emphasizing the need for careful monitoring and management during pregnancy to mitigate associated complications.

V. Conclusion

When compared to women without GDM, the pregnant women with GDM in this study had noticeably higher rates of pregnancy-induced hypertension, cesarean sections, maternal complications (such as a high rate of preeclampsia), neonatal complications (such as an increased incidence of jaundice cases), and NICU stays. The notion that pregnant women with GDM have higher incidence of maternal and neonatal problems is supported by these findings.

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