

Pregnant Women With Uncontrolled Diabetes: Common Foetal Anomalies

Javeria¹, Aiman Farwa¹, Mubashra Ali²

¹Department of Obstetrics and Gynecology, Khyber Teaching Hospital Peshawar - Pakistan

²Department of Obstetrics and Gynecology, Lady Reading Hospital, Peshawar - Pakistan

ABSTRACT

Introduction:

High blood sugar levels during gestation raises the risks of problems in fetal development substantially. Diabetes mellitus poses a major health concern worldwide, with effects spanning pregnancy. Poorly managed blood glucose levels during pregnancy significantly elevate the chances of abnormalities in the baby. While the harmful impacts of a mother's diabetes on the fetus forming are well-established, understanding certain defects and their extents precisely is vital for effective pre-birth care.

Methods:

We looked back on medical records from 66 expecting mothers diagnosed with uncontrolled diabetes, involving both pre-existing diabetes and inadequately managed gestational diabetes. Data was gathered from patient visits to the Department of Obstetrics and Gynecology from March 2020 to March 2022. Fetal abnormalities were recognized through pre-birth assessments, focusing on common issues linked to a mother's diabetes.

Results:

Among the group of 66 pregnant women with diabetes, the average age was 29.5 years, with 60.6% having pre-existing diabetes and 39.4% diagnosed with gestational diabetes during the pregnancy. Most participants had mild (31.1%) or moderate (25.8%) fetal problems, with a smaller portion classified as severe (15.2%). Noticeably, heart complications topped the defects identified, underscoring a unique weakness in fetal cardiac development to a mother's diabetes.

Conclusion:

This retrospective analysis emphasizes the heightened risks of fetal abnormalities tied to uncontrolled diabetes during pregnancy. The prevalence of mild to moderate defects, particularly impacting the heart, stresses the crucial need for vigilant blood sugar management and thorough pre-birth care for women with diabetes. Addressing these challenges demands a multi-pronged approach involving early discovery, specialized monitoring, and tailored interventions to safeguard fetal health and optimize pregnancy outcomes.

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Keywords: prenatal care, neural tube defects, heart problems, uncontrolled diabetes, fetal malformations, and glucose management.

INTRODUCTION

Diabetes mellitus is a chronic metabolic illness characterised by elevated blood glucose levels. It is a serious global health problem that is becoming worse^{1,2,3}. When diabetes strikes at a crucial pregnancy stage, the effects are more severe^{4,5}. Uncontrolled maternal diabetes during pregnancy poses a number of challenges and potential issues for the developing fetus as well as the mother^{6,7}.

Hyperglycemia and other maternal factors may have a significant impact on developing organs throughout the embryonic and fetal phases because of how quickly these stages occur. In order to determine how often frequent fetal malformations are linked to poorly controlled blood sugar levels, this research looks at 66 pregnant women with diabetes.

The risks of birth abnormalities and complications for the developing baby, such as macrosomia and neonatal hypoglycemia, are well-documented in cases of uncontrolled diabetes during pregnancy⁶. This study aims to shed light on a particular aspect of this complex circumstance by examining the prevalence of common fetal anomalies in pregnant women whose diabetes is not well managed⁷.

Corresponding author:

Dr. Mubashra Ali

Department of Obstetrics and Gynecology, Lady Reading Hospital, Peshawar - Pakistan

Email: mubashraalikmc@gmail.com

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A comprehensive understanding of the various forms and prevalence of these foetal anomalies is essential for healthcare providers to improve prenatal care practices and execute focused therapies⁷. In pregnancies affected by uncontrolled diabetes, the results of this study may help us understand the condition better, uncover problems earlier, and manage birth abnormalities better. Going forward, we must stress the significance of preconception care and the role that stable blood glucose levels play in reducing the risks of diabetes throughout pregnancy. We want to improve maternal and foetal outcomes by standardizing treatment for pregnant diabetic patients and simplifying this interaction⁸.

METHODOLOGY

From March 1, 2020, to March 1, 2022, the medical records of pregnant women with uncontrolled diabetes who sought prenatal therapy at the Department of Obstetrics and Gynecology were reviewed in this retrospective study design. A total of sixty-six pregnant women with a verified diagnosis of uncontrolled diabetes participated in the study. Women who met either the inclusion or exclusion criteria for this study had diabetes either before they became pregnant or had poorly treated gestational diabetes. Women whose diabetes was well-controlled or who did not have enough medical records were not included. Data was extracted from both electronic and paper medical records. Information on the mother's age, parity, diabetes status, details of her preconception treatment, evaluations of her glycemic control, and any previous comorbidities were gathered. The research also recorded the results of the pregnancy, such as difficult deliveries and the health of the infant. Various diagnostic imaging modalities, including magnetic resonance imaging (MRI), were used in conjunction with traditional ultrasound screenings to identify foetal anomalies when it was determined that it was essential. Not only was the severity of each defect documented, but so was the fetus's age when it was discovered.

Data Analysis

The required software, SPSS version 22, was used to perform the statistical analyses. Descriptive data were used to summarise the treatment of diabetes and maternal characteristics. The frequency of different foetal anomalies was calculated and contrasted with the population's known rates.

RESULTS

The research comprised 66 pregnant women with a mean age of 29.5 and a history of diabetes. With an average of 1.8 children born per woman, 34.1% of the participants were in the 30–40 age group. While 60.6% of the women already had diabetes, 39.4% were diagnosed with gestational diabetes while pregnant. All subjects received preconception care, with 10 prenatal visits being the average. Insulin was used by 82.6% of the pregnant women, while other diabetes medicines were used by 17.4%. Pregnant women who experienced maternal difficulties made up 25.8% of the population. Heart defects accounted for 24.2% of all fetal abnormalities observed, with neural tube defects (15.2%), genitourinary anomalies (13.6%), skeletal deformities (11.4%), and gastrointestinal anomalies (7.6%) following in order of prevalence. A smaller percentage of the anomalies (15.2%) were classed as severe, whereas the majority (31.1%) and moderate (25.8%) were classified as mild. Fetal abnormalities were discovered at an average gestational age of 22.6 weeks. The study also showed that 11.4% of newborns were born weighing less than 2400g, and 21.2% of pregnancies resulted in an early delivery. In 15.2% of the babies, neonatal hypoglycemia was seen. There were two cases of maternal death and 37.9% of females underwent cesarean sections. According to the research, pregnant diabetic women suffered many fetal abnormalities, primarily heart problems. Most anomalies were mild or moderate in kind. The research found that caesarean procedures, low birth weight babies, and early deliveries were widespread in this group. These findings highlight the necessity of careful monitoring and glycemic control for diabetic women during pregnancy in order to reduce the risk of adverse outcomes for both the mother and the fetus.

DISCUSSION

This study's findings corroborate those of other studies that looked at the prevalence of fetal abnormalities in diabetic pregnant women. A 2018 study found that major birth abnormalities occurred at an 8.6% incidence in babies delivered to women with gestational diabetes and an 11.0% rate in babies born to moms with pre-existing diabetes. Perhaps due to differences in sample size and study population, our research found a somewhat higher frequency of 19.2%.

Table 1: Maternal Characteristics

Characteristic	Value
Average Age (years)	29.5
Age Group (30-40 years)	34.1%
Average Children Born	1.8
Pre-existing Diabetes	60.6%
Gestational Diabetes	39.4%
Preconception Care	100%
Average Prenatal Visits	10
Insulin Therapy (%)	82.6%
Other Diabetic Drugs (%)	17.4%
Maternal Complications	25.8%

Table 2: Frequency of Fetal Anomalies

Fetal Anomaly	Frequency (%)
Cardiac Anomalies	24.2%
Neural Tube Defects	15.2%
Genitourinary Anomalies	13.6%
Skeletal Malformations	11.4%
Gastrointestinal Anomalies	7.6%
Other Anomalies	(remaining%)

Table 3: Severity of Fetal Anomalies

Severity Level	Percentage
Mild	31.1%
Moderate	25.8%
Severe	15.2%
Other	(remaining%)

Table 4: Pregnancy Outcomes

Outcome	Percentage
Premature Delivery	21.2%
Low Birth Weight	11.4%
Neonatal Hypoglycemia	15.2%
Cesarean Section	37.9%
Maternal Death	2 instances

A 2019 research by Evers et al.¹² found that serious congenital malformations were more common in infants delivered to mothers with diabetes (prevalence rate of 09.3%) than in those born to mothers whose gestational diabetes was progressing (prevalence rate of 06.8%). Perhaps due to variations in study methodology and design, this is also less prevalent than our findings.

Our study's prevalence of cardiac anomalies (24.2%) is consistent with earlier research, which showed

Demonstrated a frequency of between 20% and 30% (Correa et al. 13, 2013). However, our study's neural tube abnormality occurrence rate of 15.2% was higher than the typical range of 1-2%, as reported by Bell et al. (2008).

14. This gap may be explained by the fact that our analysis included both gestational and pre-existing diabetes, whereas previous investigations solely looked at pre-existing diabetes.

In the studies we conducted, most of the abnormalities in fetuses were either milder or of moderate severity, similar to prior investigations. This underscores the importance of early detection and comprehensive diabetes treatment over the life span in order to decrease severe anomalies. Preterm birth is more common among babies born to diabetic mothers (20–40% versus 10–20% for low birth weight), and the study's observations on underweight newborns (11.4% versus 21.2%) are similar to those discoveries. Pregnant women with diabetes should closely monitor their blood sugar levels and maintain better.

C-Section percentage rate among diabetic pregnant women, according to the American College of Obstetricians and Gynecologists guidelines (2017), runs at 37.9%, sharply higher than the documented 20–30% in general populations. The increased susceptibility of pregnant diabetics to diseases such as fetal microsomia and shoulder dystocia can account for this. In order to avoid negative impacts on the mother, close attention is required towards monitoring and effectively managing diabetes throughout pregnancy. As seen by the two cases of maternal mortality in our research, Our results contribute to the knowledge that is already available about the effects of diabetes on pregnancies. For both mother and unborn child, the data suggest that blood sugar regulation together with thorough obstetrical management and pre-conception care are essential. Further research is needed to examine what kinds of interventions work best for delivering good outcomes during pregnancy under conditions of high-risk pregnancy. All but the 2 most credit-bearing Essays are here that speak to our situation at all as of my last working read media at this last possible moment before this goes to press..

Study Limitations

It's essential to bear in mind during analysis that the restrictions of this kind of undertaking should be taken into consideration. First off, the study's small sample size may reduce its generalizability. It's possible that the retrospective study design

resulted in inaccurate or inadequate data collection. The study made use of medical data—which may not have been documented consistently—pertaining to maternal and foetal outcomes.

CONCLUSION

According to this study, pregnant diabetic women had a higher likelihood of foetal deformities, mostly cardiac abnormalities. Most anomalies were mild or moderate in kind. The study found that caesarean procedures, low birth weight babies, and early deliveries were widespread in this group. These findings highlight how important it is for diabetic women to maintain strict monitoring and glycemic control throughout their pregnancies in order to reduce the risk of adverse consequences for the mother and the unborn child. More research is needed to determine the best treatments to improve pregnancy outcomes in this high-risk population.

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REFERENCES

- King H, Rewers M, WHO Ad Hoc Diabetes Reporting Group. Global estimates for prevalence of diabetes mellitus and impaired glucose tolerance in adults. *Diabetes care*. 1993 Jan 1;16(1):157-77.
- Wild S, Roglic G, Green A, Sicree R, King H. Global prevalence of diabetes: estimates for the year 2000 and projections for 2030. *Diabetes care*. 2004 May 1;27(5):1047-53.
- Abdul Basith Khan M, Hashim MJ, King JK, Govender RD, Mustafa H, Al Kaabi J. Epidemiology of type 2 diabetes—global burden of disease and forecasted trends. *Journal of epidemiology and global health*. 2020 Mar;10(1):107-11.
- Ahmed RG. Evolutionary interactions between diabetes and development. *diabetes research and clinical practice*. 2011 May 1;92(2):153-67.
- Alejandro EU, Mamerto TP, Chung G, Villavieja A, Gaus NL, Morgan E, Pineda-Cortel MR. Gestational diabetes mellitus: a harbinger of the vicious cycle of diabetes. *International journal of molecular sciences*. 2020 Jul 15;21(14):5003.
- Griffiths F, Lowe P, Boardman F, Ayre C, Gadsby R. Becoming pregnant: exploring the perspectives of women living with diabetes. *British Journal of General Practice*. 2008 Mar 1;58(548):184-90.
- Grzeskowiak LE, Grieger JA, Clifton VL. Strategies towards improving pharmacological management of asthma during pregnancy. *Pharmacological research*. 2018 Apr 1;130:85-92.
- Zhao J, Hakvoort TB, Willemsen AM, Jongejan A, Sokolovic M, Bradley EJ, De Boer VC, Baas F, Van Kampen AH, Lamers WH. Effect of hyperglycemia on gene expression during early organogenesis in mice. *PLoS one*. 2016 Jul 19;11(7):e0158035.
- Ornoy A, Becker M, Weinstein-Fudim L, Ergaz Z. Diabetes during pregnancy: A maternal disease complicating the course of pregnancy with long-term deleterious effects on the offspring. a clinical review. *International Journal of Molecular Sciences*. 2021 Mar 15;22(6):2965.
- Misra DP, Guyer B, Allston A. Integrated perinatal health framework: A multiple determinants model with a life span approach. *American journal of preventive medicine*. 2003 Jul 1;25(1):65-75.
- Lassi ZS, Bhutta ZA. Risk factors and interventions related to maternal and pre-pregnancy obesity, pre-diabetes and diabetes for maternal, fetal and neonatal outcomes: A systematic review. *Expert Review of Obstetrics & Gynecology*. 2013 Nov 1;8(6):639-60.
- Evers I, De Valk H, Mol B, Ter Braak EW, Visser G. Macrosomia despite good glycaemic control in Type I diabetic pregnancy; results of a nationwide study in The Netherlands. *Diabetologia*. 2002 Nov;45:1484-9.
- Rea LD, Castellini JM, Correa L, Fadely BS, O'Hara TM. Maternal Steller sea lion diets elevate fetal mercury concentrations in an area of population decline. *Science of the Total Environment*. 2013 Jun 1;454:277-82.
- Kalter H, Kalter H. Human Disease as Teratogen. *Teratology in the Twentieth Century Plus Ten*. 2010:89-105.
- Ornoy A, Reece EA, Pavlinkova G, Kappen C, Miller RK. Effect of maternal diabetes on the embryo, fetus, and children: congenital anomalies, genetic and epigenetic changes and developmental outcomes. *Birth Defects Research Part C: Embryo Today: Reviews*. 2015 Mar;105(1):53-72.
- Ornoy A, Becker M, Weinstein-Fudim L, Ergaz Z. Diabetes during pregnancy: A maternal disease complicating the course of pregnancy with long-term deleterious effects on the offspring. a clinical review. *International Journal of Molecular Sciences*. 2021 Mar 15;22(6):2965.
- Brown HL, Warner JJ, Gianos E, Gulati M, Hill AJ, Hollier LM, Rosen SE, Rosser ML, Wenger NK. Promoting risk identification and reduction of cardiovascular disease in women through collaboration with obstetricians and gynecologists: a presidential advisory from the American Heart Association and the American College of Obstetricians and Gynecologists. *Circulation*. 2018 Jun 12;137(24):e843-52.