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Original Research Article

Fetal Anomalies in Diabetic Mother by Ultrasonography- A Descriptive Cross Sectional Study in Hospital Based Population

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Abstract: ***Background*:** Maternal diabetes mellitus is associated with fetal structural abnormalities, altered cardiac development, and changes in fetal growth. Ultrasonography provides a non-invasive method for evaluating these findings and assessing fetal well-being. ***Aim*:** To evaluate fetal cardiac changes and other significant ultrasonographic findings in pregnancies complicated by diabetes mellitus and assess their association with the type of maternal diabetes and glycemic control. ***Methods*:** This descriptive observational cross-sectional study included 80 pregnant women with pregestational diabetes mellitus (PGDM) or gestational diabetes mellitus (GDM) attending a tertiary care centre in Maharashtra. Clinical and biochemical details, including maternal glycated haemoglobin (HbA1c), were recorded. Fetal ultrasonography was performed to assess structural anomalies, cardiac parameters, fetal growth, amniotic fluid, placental characteristics, and Doppler indices. Associations were evaluated using appropriate statistical tests, with $p<0.05$ considered statistically significant. ***Results*:** Fetal structural anomalies were detected in 10 (12.5%) pregnancies. Anomalies were observed in 6/26 (23.1%) women with PGDM and 4/54 (7.4%) with GDM, although this difference was not statistically significant (p=0.070). Interventricular septal (IVS) hypertrophy was significantly more frequent in PGDM than GDM (26.9% vs 5.6%; p=0.011), as was cardiomegaly (23.1% vs 1.9%; p=0.004). Mean IVS thickness was also greater in PGDM. Compared with controlled glycemia, uncontrolled glycemia was associated with higher frequencies of polyhydramnios (30.6% vs 9.1%; p=0.021), IVS hypertrophy (22.2% vs 4.5%; p=0.037), and cardiomegaly (16.7% vs 2.3%; p=0.042). Fetal estimated weight and abdominal circumference were also higher in the uncontrolled group. ***Conclusion*:** Fetal ultrasonography identified structural and cardiac abnormalities in pregnancies complicated by diabetes. Cardiac changes were more frequent in PGDM and pregnancies with poorer glycemic control. Larger prospective studies are needed to confirm these associations and determine their clinical significance.

Keywords: Diabetes Mellitus, Fetal Ultrasonography, Interventricular Septal Hypertrophy, Cardiomegaly, Glycemic Control.

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INTRODUCTION

Maternal diabetes mellitus is associated with an increased risk of adverse fetal outcomes, including congenital malformations, abnormal fetal growth, and cardiac abnormalities [1-4]. The risk of congenital anomalies is particularly associated with pregestational diabetes, as maternal hyperglycemia during early embryogenesis may interfere with normal organ development [2-6]. Congenital heart defects represent an important component of diabetes-associated fetal malformations, with evidence suggesting a higher risk in pregnancies complicated by pregestational diabetes than in those with gestational diabetes mellitus (GDM) [7, 8].

In addition to structural malformations, maternal diabetes may influence fetal myocardial development and function. Fetal hyperinsulinemia associated with maternal hyperglycemia is considered an

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important contributor to myocardial hypertrophy [9, 10]. Ultrasonographic and fetal echocardiographic studies have reported increased interventricular septal (IVS) thickness, cardiac enlargement, and changes in fetal cardiac function among pregnancies complicated by diabetes [11-14]. A systematic review and meta-analysis involving 39 studies also found that fetal cardiac hypertrophy and impaired diastolic function were more frequently observed in diabetic pregnancies, although findings related to systolic function were less consistent [15, 16].

The severity of these cardiac changes may vary according to diabetes type, maternal glycemic control, and gestational age. Studies have reported greater myocardial hypertrophy in pregnancies with suboptimal glycemic control, highlighting the clinical value of assessing fetal cardiac morphology alongside conventional fetal biometry [12-18]. Ultrasonography also permits evaluation of fetal growth, amniotic fluid volume, placental characteristics, and fetoplacental Doppler parameters, providing a broader assessment of fetal well-being [19].

Despite these advances, the extent and pattern of fetal cardiac changes may differ across populations and clinical settings. Therefore, evaluating fetal cardiac findings in relation to maternal diabetes type and glycemic control may provide useful information for antenatal assessment. The present study evaluates fetal cardiac changes and other significant ultrasonographic findings in pregnancies complicated by diabetes mellitus, with particular attention to IVS hypertrophy, cardiomegaly, IVS thickness, and their associations with pregestational diabetes, GDM, and maternal glycemic control.

OBJECTIVES

Objectives:

1. To determine the prevalence and spectrum of fetal structural anomalies detected by ultrasonography in pregnant women with diabetes mellitus.
2. To evaluate fetal cardiac changes such as interventricular septal hypertrophy, cardiomegaly, and altered cardiac function in pregnancies complicated by pregestational and gestational diabetes mellitus.
3. To assess the association of maternal glycemic control and type of diabetes with fetal ultrasonographic findings, including cardiac abnormalities, fetal growth, amniotic fluid volume, and Doppler parameters.

METHODOLOGY

The study was conducted as a descriptive observational study using a cross-sectional design over a period of 18 months in the Department of Radiodiagnosis, in collaboration with the Department of Obstetrics and Gynaecology, at a tertiary care centre in Maharashtra, India. A total of 80 pregnant women with pregestational diabetes mellitus (Type 1 or Type 2) or gestational diabetes mellitus (GDM) were enrolled using convenience sampling. The sample size was estimated using a single-proportion formula, yielding a minimum of 78 participants, which was increased to 80 to account for possible incomplete data.

Pregnant women in the second or third trimester who met the eligibility criteria and provided written informed consent were included. Non-diabetic women, women in the first trimester, those unwilling to participate, and those with specified confounding comorbidities or known teratogenic exposure were excluded. Maternal demographic and clinical details, diabetes type and duration, HbA1c levels, obstetric history, and gestational age were recorded using a pre-designed semi-structured proforma. Glycemic control was classified according to HbA1c values.

Ultrasonographic examinations were performed by trained radiologists using standard diagnostic ultrasound equipment with 3.5–5 MHz curvilinear transducers. Fetal structural anatomy, biometry, estimated fetal weight, amniotic fluid index, placental thickness, and Doppler parameters were assessed. Fetal cardiac evaluation included interventricular septal thickness, cardiac size, and diastolic function. Data were entered into Microsoft Excel 2019 and analyzed using IBM SPSS Statistics version 26.0. Categorical variables were expressed as frequencies and percentages, while continuous variables were summarized using appropriate measures of central tendency and dispersion. Group comparisons were performed using the chi-square test or Fisher's exact test for categorical variables and the independent-samples t-test or Mann–Whitney U test for continuous variables, as appropriate. A two-tailed p-value of less than 0.05 was considered statistically significant. Institutional Ethics Committee approval was obtained, and written informed consent was secured from all participants. Participant confidentiality was maintained throughout the study.

RESULTS AND OBSERVATIONS

A total of 80 pregnant women with diabetes mellitus underwent fetal ultrasonographic assessment. The results were organized into maternal baseline characteristics, fetal structural anomalies, fetal growth and amniotic fluid findings, cardiac parameters, and comparisons according to diabetes type and glycemic control.

Baseline Maternal and Clinical Characteristics

The mean maternal age was 28.2 ± 4.4 years, with a range of 19–39 years. The largest age group was 25–30 years, comprising 32 (40.0%) participants. The mean BMI was 27.7 ± 3.6 kg/m², and 63 (78.8%) participants were overweight or obese. GDM was the most common diabetes category, accounting for 54 (67.5%) participants, while 26 (32.5%) had PGDM.

Uncontrolled glycemia, defined as HbA1c greater than 7.0%, was observed in 36 (45.0%) participants.

Table 1: Baseline demographic, clinical, and obstetric characteristics (n = 80)

Characteristic	Category	n (%) or summary
Maternal age	Less than 25 years	17 (21.2%)
	25–30 years	32 (40.0%)
	31–35 years	23 (28.8%)
	More than 35 years	8 (10.0%)
	Mean age ± SD	28.2 ± 4.4 years
BMI	Normal weight	17 (21.2%)
	Overweight	46 (57.5%)
	Obese	17 (21.2%)
	Mean BMI ± SD	27.7 ± 3.6 kg/m²
Diabetes type	Type 1 DM	8 (10.0%)
	Type 2 DM	18 (22.5%)
	GDM	54 (67.5%)
	PGDM, combined	26 (32.5%)
Glycemic control	Controlled, HbA1c ≤7%	44 (55.0%)
	Uncontrolled, HbA1c >7%	36 (45.0%)
Gravidity	Primigravida	20 (25.0%)
	Multigravida	60 (75.0%)
Previous miscarriage	Yes	12 (15.0%)
Previous anomalous pregnancy	Yes	1 (1.2%)
Family history of diabetes	Yes	42 (52.5%)
Gestational age at scan	Second trimester	33 (41.2%)
	Third trimester	47 (58.8%)

BMI: body mass index; DM: diabetes mellitus; GDM: gestational diabetes mellitus; PGDM: pregestational diabetes mellitus; SD: standard deviation.

The majority of participants were multigravida, and a family history of diabetes was reported by 52.5%. Most scans were performed in the third trimester (58.8%). The mean HbA1c was 7.0 ± 1.1% for the overall cohort, with mean values of 6.6 ± 0.8% in GDM, 8.0 ± 1.1% in type 2 DM, and 7.5 ± 1.5% in type 1 DM.

Prevalence and Distribution of Fetal Structural Anomalies

Fetal structural anomalies were detected in 10 of 80 pregnancies (12.5%), while 70 (87.5%) had no detected structural anomaly. The cardiovascular system was the most frequently represented system, accounting for four of the ten reported anomalies (40.0%). The central nervous system accounted for three cases (30.0%), while the urogenital/renal, gastrointestinal, and musculoskeletal systems each accounted for one case.

Table 2: Prevalence and system-wise distribution of fetal anomalies

Outcome	Number (n)	Percentage
No anomaly detected	70	87.5% of all participants
Anomaly detected	10	12.5% of all participants
Cardiovascular anomalies	4	40.0% of anomalies
Central nervous system anomalies	3	30.0% of anomalies
Urogenital/renal anomalies	1	10.0% of anomalies
Gastrointestinal anomalies	1	10.0% of anomalies
Musculoskeletal anomalies	1	10.0% of anomalies
Major anomalies	7	70.0% of anomalies
Minor anomalies	3	30.0% of anomalies

The specific findings included two ventricular septal defects, one atrial septal defect, one case of interventricular septal hypertrophy, anencephaly, spina bifida, ventriculomegaly, hydronephrosis, omphalocele, and caudal regression syndrome. Six of the ten anomaly cases occurred in pregnancies complicated by PGDM, and nine of the ten had maternal HbA1c values above 6.5%.

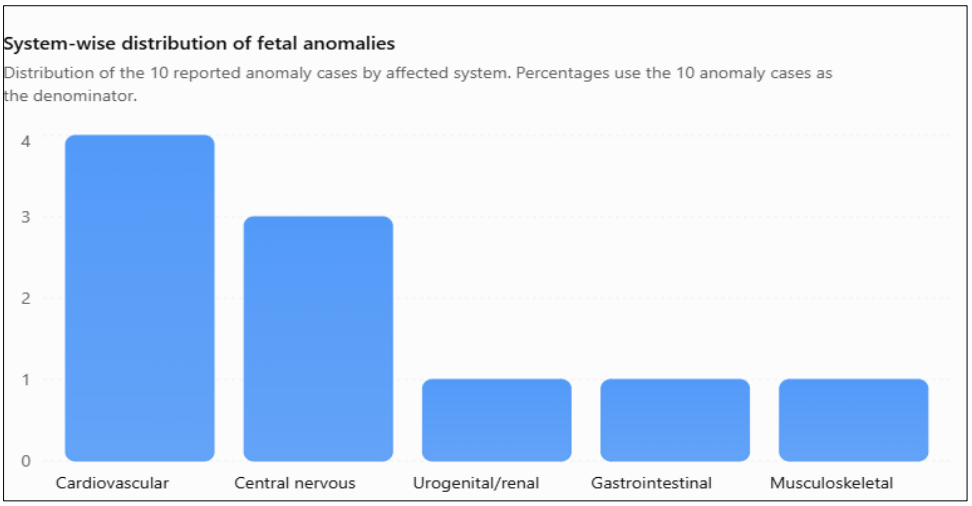


Figure 1: System-wise distribution of fetal anomalies, showing cardiovascular abnormalities as the largest category, followed by central nervous system abnormalities

Association of Fetal Anomalies with Diabetes Type and Glycemic Control

The anomaly rate varied across diabetes categories. It was highest among women with type 1 DM (3/8; 37.5%), followed by type 2 DM (3/18; 16.7%) and GDM (4/54; 7.4%). When type 1 and type 2 DM were combined as PGDM, the anomaly rate was 23.1%, compared with 7.4% in GDM. This difference was not statistically significant (\(p=0.070\)).

Similarly, anomalies were detected in 7/36 (19.4%) participants with uncontrolled glycemia compared with 3/44 (6.8%) participants with controlled glycemia. Although the observed anomaly rate was higher in the uncontrolled group, the difference did not reach statistical significance (\(p=0.104\)).

Table 3: Fetal anomaly rates according to diabetes type and glycemic control

Comparison	Anomaly present, n (%)	No anomaly, n (%)	p-value
Type 1 DM (n=8)	3 (37.5)	5 (62.5)	—
Type 2 DM (n=18)	3 (16.7)	15 (83.3)	—
GDM (n=54)	4 (7.4)	50 (92.6)	—
PGDM combined (n=26)	6 (23.1)	20 (76.9)	0.070*
GDM (n=54)	4 (7.4)	50 (92.6)	Reference
Controlled glycemia (n=44)	3 (6.8)	41 (93.2)	0.104†
Uncontrolled glycemia (n=36)	7 (19.4)	29 (80.6)	—

PGDM versus GDM, Fisher's exact test as reported in the dissertation. †Controlled versus uncontrolled glycemia, Fisher's exact test as reported. Individual type 1 versus type 2 versus GDM pairwise p-values were not provided in the available results.

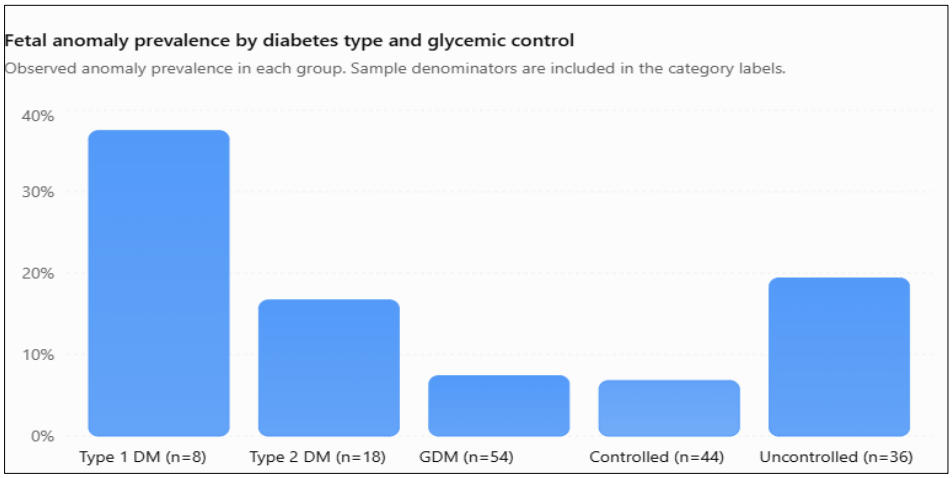


Figure 2: Fetal anomaly prevalence according to diabetes type and glycemic control. The graph should display the observed proportions, with denominators shown for each group

Fetal Biometry and Growth Profile

The overall mean estimated fetal weight (EFW) was 1677.5 ± 1223.9 g. The majority of fetuses (55/80; 68.8%) were classified as appropriate for gestational age (AGA). LGA was observed in 19 (23.8%) fetuses, SGA in 6 (7.5%), and macrosomia in 8 (10.0%).

Mean biometric measurements were higher in third-trimester scans than in second-trimester scans. This is expected to be influenced by gestational age at examination and should not, by itself, be interpreted as evidence of abnormal growth.

Table 4: Fetal biometric measurements and growth categories

Parameter	Overall (n=80)	Second trimester (n=33)	Third trimester (n=47)
Biparietal diameter (mm)	71.8 ± 18.1	52.6 ± 8.5	85.4 ± 7.6
Head circumference (mm)	262.2 ± 62.9	193.9 ± 28.9	310.1 ± 22.8
Abdominal circumference (mm)	251.7 ± 83.3	166.9 ± 32.4	311.2 ± 49.0
Femur length (mm)	53.7 ± 15.0	37.7 ± 7.2	64.9 ± 6.4
Estimated fetal weight (g)	1677.5 ± 1223.9	500.4 ± 261.0	2504.1 ± 912.8
HC/AC ratio	1.1 ± 0.1	1.2 ± 0.1	1.0 ± 0.1
Growth category	**Number (n)**	**Percentage (%)**	
Appropriate for gestational age	55	68.8	
Large for gestational age	19	23.8	
Small for gestational age	6	7.5	
Macrosomia	8	10.0	

Biometric values are mean ± SD. Growth categories are presented separately; macrosomia may overlap with LGA and should not be added to the other categories.

Amniotic Fluid and Fetal Cardiac Findings

Normal amniotic fluid volume was observed in 59 (73.8%) participants. Polyhydramnios was identified in 15 (18.8%), whereas oligohydramnios was observed in 6 (7.5%). The mean overall amniotic fluid index (AFI) was 15.8 ± 7.7 cm.

On cardiac assessment, the mean IVS thickness was 4.5 ± 1.3 mm. IVS hypertrophy, defined in the dissertation as IVS thickness greater than 6 mm, was recorded in 10 (12.5%) cases. Diastolic dysfunction, defined as an E/A ratio below 0.70, was observed in 23 (28.8%), while cardiomegaly was identified in 7 (8.8%).

Table 5: Amniotic fluid and fetal cardiac assessment

Parameter	Category/statistic	Number (n)	Percentage (%)
AFI	Normal, 5–25 cm	59	73.8
	Polyhydramnios, >25 cm	15	18.8
	Oligohydramnios, 6 mm	10	12.5
	No IVS hypertrophy, ≤6 mm	70	87.5
E/A ratio	Mean ± SD	0.7 ± 0.1	—

| | Diastolic dysfunction, 7.0%. This definition should be used consistently throughout.

DISCUSSION

The present study evaluated fetal cardiac changes and other ultrasonographic findings in 80 pregnancies complicated by diabetes mellitus, with particular emphasis on differences between pregestational diabetes mellitus (PGDM) and gestational diabetes mellitus (GDM), and between controlled and uncontrolled maternal glycemia. The findings highlight the importance of assessing fetal cardiac morphology and function in addition to screening for congenital structural anomalies. Previous research has established an association between maternal diabetes and adverse fetal outcomes, including congenital malformations and abnormalities of cardiac development [1-5].

Fetal structural anomalies were detected in 10 (12.5%) pregnancies. The reported abnormalities involved the cardiovascular, central nervous, renal, gastrointestinal, and musculoskeletal systems. The relationship between maternal diabetes and congenital malformations has been documented in population-based studies, particularly among women with pregestational diabetes [2-5]. Hyperglycemia during early embryonic development is considered an important contributor to the increased risk of congenital malformations. However, the present study did not include a non-diabetic control group; therefore, its anomaly prevalence cannot establish the excess risk attributable to diabetes compared with pregnancies without diabetes. Furthermore, the relatively small number of detected anomalies limits reliable comparisons between individual anomaly types.

An important finding was the higher frequency of fetal cardiac abnormalities in the PGDM group. Interventricular septal hypertrophy was identified in 26.9% of the PGDM group compared with 5.6% of the GDM group, while cardiomegaly was observed in 23.1% and 1.9%, respectively. Mean interventricular septal thickness was also significantly higher among

pregnancies complicated by PGDM. These findings are consistent with previous research describing increased fetal myocardial thickness and cardiac changes in pregnancies complicated by diabetes [7-10]. Maternal hyperglycemia and fetal hyperinsulinemia have been proposed as important mechanisms contributing to myocardial hypertrophy. Nevertheless, the present observational findings demonstrate associations rather than proving a direct causal relationship.

The comparison according to glycemic control further supported the relationship between maternal metabolic status and fetal cardiac findings. Interventricular septal hypertrophy, cardiomegaly, and increased interventricular septal thickness were more frequently observed in the uncontrolled glycemia group. Previous fetal echocardiographic research has similarly reported cardiac structural and functional differences in diabetic pregnancies [9-12]. These findings support the clinical relevance of assessing fetal cardiac morphology in pregnancies complicated by diabetes, particularly when glycemic control is suboptimal. However, the study's sample size and cross-sectional design do not permit conclusions about whether improving glycemic control would reverse the observed cardiac changes.

Polyhydramnios was significantly more frequent in the uncontrolled glycemia group than in the controlled group. Higher estimated fetal weight and abdominal circumference were also observed among women with uncontrolled glycemia. These findings are consistent with the recognized association between maternal diabetes, fetal growth disturbances, and altered amniotic fluid volume [1-19]However, the differences in large-for-gestational-age and small-for-gestational-age frequencies were not statistically significant in the comparison between PGDM and GDM. Thus, the observed results suggest that glycemic control may be associated with selected fetal growth and fluid-related findings, but the evidence was not uniform across all parameters.

The overall ultrasonographic profile also demonstrated that fetal assessment in diabetic pregnancies extends beyond the detection of structural anomalies. Diastolic dysfunction was reported in 28.8% of cases, while abnormal Doppler findings, placental thickening, increased fetal subcutaneous fat, and hepatomegaly were also observed. Previous systematic reviews have described fetal cardiac functional changes in pregnancies complicated by maternal diabetes, although the magnitude and consistency of findings vary between studies [10, 11]. These results support the potential value of a comprehensive ultrasound assessment that includes fetal anatomy, cardiac measurements, growth, amniotic fluid, and Doppler parameters.

Several limitations should be considered when interpreting these findings. The study included only 80 participants from a single tertiary-care setting and did not include a non-diabetic comparison group. The small number of structural anomalies limits the statistical power of comparisons. Additionally, several outcomes were tested, increasing the possibility of chance-positive findings. The observational cross-sectional design also limits conclusions about causality and changes over time. Finally, interventricular septal hypertrophy should be reported as a cardiac phenotype rather than automatically counted as a congenital structural malformation. Despite these limitations, the study provides a useful description of fetal ultrasonographic findings in diabetic pregnancies and identifies fetal cardiac changes as an important area for further investigation.

CONCLUSION

The present study found that pregnancies complicated by diabetes mellitus exhibited a range of fetal ultrasonographic abnormalities, including structural anomalies, cardiac changes, fetal growth disturbances, amniotic fluid abnormalities, and Doppler findings. Fetal cardiac changes were particularly notable, with interventricular septal hypertrophy, cardiomegaly, and increased interventricular septal thickness observed more frequently in pregnancies complicated by PGDM and among women with uncontrolled glycemia. Uncontrolled glycemia was also associated with higher estimated fetal weight, greater abdominal circumference, and a higher frequency of polyhydramnios. These findings reinforce the importance of comprehensive fetal ultrasonographic assessment in diabetic pregnancies, including evaluation of cardiac morphology and function alongside conventional fetal anatomy and growth parameters. Previous research has similarly highlighted the association between maternal diabetes and fetal cardiac abnormalities [9-12]. However, because this was a small, hospital-based observational study without a non-diabetic control group, the results should be interpreted as associations rather than evidence of causation. Larger prospective studies with standardized fetal cardiac assessment and longitudinal neonatal follow-up are needed to clarify the clinical significance of these findings.

REFERENCES

1. American Diabetes Association Professional Practice Committee. 15. Management of diabetes in pregnancy: Standards of Care in Diabetes—2025. Diabetes Care. 2025;48(Suppl 1):S306–S320. doi:10.2337/dc25-S015.
2. Correa A, Gilboa SM, Besser LM, Botto LD, Moore CA, Hobbs CA, et al. Diabetes mellitus and birth defects. Am J Obstet Gynecol. 2008;199(3):237.e1–237.e9. doi:10.1016/j.ajog.2008.06.028.
3. Garne E, Loane M, Dolk H, Barisic I, Addor MC, Arriola L, et al. Spectrum of congenital anomalies in pregnancies with pregestational diabetes. Birth Defects Res A Clin Mol Teratol. 2012;94(3):134–140. doi:10.1002/bdra.22886.

4. Balsells M, García-Patterson A, Gich I, Corcoy R. Major congenital malformations in women with gestational diabetes mellitus: a systematic review and meta-analysis. Diabetes Metab Res Rev. 2012;28(3):252–257. doi:10.1002/dmrr.1304.
5. Chen L, Yang T, Chen L, Wang L, Wang T, Zhao L, et al. Risk of congenital heart defects in offspring exposed to maternal diabetes mellitus: an updated systematic review and meta-analysis. Arch Gynecol Obstet. 2019;300(6):1491–1506. doi:10.1007/s00404-019-05376-6.
6. Dervisoglu P, Kosecik M, Kumbasar S. Effects of gestational and pregestational diabetes mellitus on the foetal heart: a cross-sectional study. J Obstet Gynaecol. 2018;38(3):408–412. doi:10.1080/01443615.2017.1410536.
7. Veille JC, Sivakoff M, Hanson R, Fanaroff AA. Interventricular septal thickness in fetuses of diabetic mothers. Obstet Gynecol. 1992;79(1):51–54.
8. Gandhi JA, Zhang XY, Maidman JE. Fetal cardiac hypertrophy and cardiac function in diabetic pregnancies. Am J Obstet Gynecol. 1995;173(4):1132–1136. doi:10.1016/0002-9378(95)91339-4.
9. Macklon NS, Hop WC, Wladimiroff JW. Fetal cardiac function and septal thickness in diabetic pregnancy: a controlled observational and reproducibility study. Br J Obstet Gynaecol. 1998;105(6):661–666. doi:10.1111/j.1471-0528.1998.tb10182.x.
10. Depla AL, de Jong BO, Kaspers L, Walther FJ, Lopriore E, Haak MC. Effect of maternal diabetes on fetal heart function on echocardiography: systematic review and meta-analysis. Ultrasound Obstet Gynecol. 2021;57(2):152–163. doi:10.1002/uog.22163.
11. Ghaderian M, Hemmat M, Behdad S, Saeedi M, Shahsanaei F. Fetal cardiac functional abnormalities assessed by echocardiography in mothers suffering gestational diabetes mellitus: a systematic review and meta-analysis. Curr Probl Cardiol. 2021;46(3):100658. doi:10.1016/j.cpcardiol.2020.100658.
12. Tejaswi GM, Samanth J, Vasudeva A, Lewis L, Kumar P, Nayak K, et al. Fetal echocardiography at term in diabetic pregnancies helps predict the adverse neonatal outcome: results of a prospective observational study from South India. Indian Heart J. 2020;72(6):576–581. doi:10.1016/j.ihj.2020.09.017.
13. Fetal cardiac function in maternal diabetes: a conventional and speckle-tracking echocardiographic study. J Am Soc Echocardiogr. 2018. PMID: 29246511.
14. Bhambhani A, Mathew A, Varunya M, Uligada S, Kala P. Role of routine fetal echocardiography in an unselected group of pregnant women for prenatal detection of cardiac malformations. Indian Heart J. 2020;72(5):427–430. doi:10.1016/j.ihj.2020.08.010.
15. American Institute of Ultrasound in Medicine. AIUM practice guideline for the performance of fetal echocardiography. J Ultrasound Med. Use the current applicable guideline version when finalizing the manuscript.
16. International Society of Ultrasound in Obstetrics and Gynecology. ISUOG Practice Guidelines (updated): fetal cardiac screening. Ultrasound Obstet Gynecol. 2023. doi:10.1002/uog.26224.
17. Correa A, Gilboa SM, Botto LD, Moore CA, Hobbs CA, Cleves MA, et al. Lack of periconceptional vitamins or supplements that contain folic acid and diabetes mellitus-associated birth defects. Am J Obstet Gynecol. 2012;206(3):218.e1–218.e13. doi: 10.1016/j.ajog.2011.12.018.
18. Becerra JE, Khoury MJ, Cordero JF, Erickson JD. Diabetes mellitus during pregnancy and the risks for specific birth defects: a population-based case-control study. Pediatrics. 1990;85(1):1–9.

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