SJIF Impact Factor: 6.711

WORLD JOURNAL OF ADVANCE HEALTHCARE RESEARCH

ISSN: 2457-0400
Volume: 9
Issue: 4
Page N. 101-105
Year: 2025

Original Article www.wjahr.com

COMPLICATIONS OF NEWBORNS WITH DIABETIC MOTHERS AT MOSUL CITY

Saad Hussein Hammo* and Omar Ahmed Mohammed

M.B.Ch.B/F.A.B.H.S Department of Pediatric, Mosul General Hospital.

Article Received date: 08 February 2025 **Article Revised date:** 28 February 2025 **Article Accepted date:** 18 March 2025

***Corresponding Author: Saad Hussein Hammo**

M.B.Ch.B/F.A.B.H.S Department of Pediatric, Mosul General Hospital.

ABSTRACT

Background: Diabetes mellitus complicates around 1% of pregnancies and it is one of the most common and dangerous metabolic diseases that impact the health of both mothers and newborns. An unfavorable pregnancy outcome is more likely to occur in pregnant women with type 1 diabetes, type 2 diabetes, and gestational diabetes mellitus. Controlling blood sugar levels both before and during pregnancy is crucial for better results. **Objectives:** Is to study the complications in infants of diabetic mothers and to see the outcome of these infants. **Methods:** The study is a hospital based, observational, descriptive, cross sectional study. It was conducted between 10th of January 2023 to the end of February 2025 at the intensive care unit of Mosul General Hospital. The questionnaire includes three parts, part one for demographic information, part two for perinatal history and part three for natal and post-natal possible complications. **Results:** The study included 50 infants with IDM out of 2000 babies admitted to NICU which represent a total incidence of IDM of (2.5%). Of them; 30 (60%) were males and 20 (40%) were females. It's evident that hypoglycemia was present among 36 (72%), followed by hyperbilirubinemia among 12 (24%), then polycythemia among 6 (12%). Hypocalcemia was present among 5 (10%), while chest x-ray positive findings (cardiomegaly, respiratory distress syndrome, ground glass appearance with air bronchogram) is prevalent among 15 (30%) followed by Echocardiogram findings (hypertrophic cardiomyopathy with and without small VSD). Lastly; blood culture was positive among 3 (6%) of the study participants. Moreover; Birth asphyxia was present among 4 (8%) babies, birth trauma among 3 (6%) and congenital short limbs among 1 (2%). **Conclusion:** A high rate of complications was noted among the infants of diabetic mothers; therefore; these infants should be born in hospitals with specialized neonatal care facilities for managing such complications; additionally, all pregnant women should be screened for gestational diabetes; and, most importantly, the mothers should follow strict glycemic control, appropriate antenatal care, and close infant monitoring to prevent morbidity and mortality which can occurred.

KEYWORDS: Newborn, Diabetic mothers, Complications, Mosul, Iraq.

1. INTRODUCTION

Diabetes mellitus (DM) complicates around 1% of pregnancies and it is one of the most common and dangerous metabolic diseases that impact the health of both mothers and newborns.[1] An unfavorable pregnancy outcome is more likely to occur in pregnant women with type 1 diabetes (T1DM), type 2 diabetes (T2DM), and gestational diabetes mellitus (GDM).[2] Controlling blood sugar levels both before and during pregnancy is crucial for better results.[3]

According to population-based studies, infants of diabetic mothers (IDMs) have a greater risk of problems.[4] The observed complications included respiratory distress syndrome (RDS), hypoglycemia, congenital abnormalities, and hyperbilirubinemia.[5] Congenital malformations being 2–3 times more likely in IDMs than in the general population.[6] The neonatal mortality rate (NDR) for newborns born to mothers with IDMs is more than five times that of infant born to mothers without diabetes.[6-7] However; with good gestational glycemic control and frequent prenatal care for diabetic mothers and infants are anticipated to enhance IDM outcomes and reduce the incidence of reported complications and mortality.[6-8]

Pregnancy-related diabetes is the second most prevalent medical problem, after hypertension.[9] Before development of specialized maternal, fetal, and neonatal care, fetal and neonatal mortality rates might reach 65%.[10] Infants of diabetic mothers have shown a nearly 30-fold reduction in mortality and morbidity since the discovery of insulin.[11] Pregnancy-related diabetes can manifest in two types: The first one when a mother who

does not have diabetes prior to getting pregnant but develops insulin resistance as a result of pregnancy hormones is said to have gestational diabetes.[12] While the second one is pregestational diabetes which is used to characterize women, who have diabetes prior to becoming pregnant.[12-13]

Blood glucose (BG) should be maintained within the normal range whether or not there are abnormal clinical signs, and patients with hypoglycemia should have prompt diagnosis and treatment because newborn hypoglycemia is associated with a poor neurological outcome.[14] The definition and screening of newborn hypoglycemia are still under debate, despite its clinical significance.[15] Clinical recommendations show postpartum glucose screening of newborns at risk, with a threshold of 47mg/dL for mild hypoglycemia and 36mg/dL for severe hypoglycemia.[16]

This study aimed to study the complications in infants of diabetic mothers and to see the outcome of these infants.

2. PATIENT AND METHODS

The survey was confidential and did not include any information that might be used to identify a specific individual. Ethical approval was given by Nineveh Health Directorate.

The current study is a an observational, descriptive, cross-sectional study was adopted in order to achieve the objectives of the present study. From 2000 patients who attend Intensive care unit of Mosul General Hospital between 10th of January 2023 to the end of February 2025, fifty patients were IDM whose mother were known to have diabetes by history of preexisting diabetes, gestational diabetes or with babies having signs of IDM. The patients case sheets were reviewed to acquire the mandatory information. This information was used to fill the checklists that been made especially for this purpose. Demographic data (gender, birth weight, gestational age, mode of delivery, history of previous affected baby, type of diabetes and mother parity). The mothers were asked about history of prolonged second stage of labor, delay first cry, vacuum extraction and looking for birth asphyxia. The babies were examined for gross congenital anomaly, signs of birth trauma like brachial plexus injury and cephalhematoma, in addition to signs of hypoglycemia like jitteriness, lethargy, irritability, poor feeding, high pitched cry, cyanosis, seizure, signs of respiratory distress, signs of polycythemia and hypocalcemia. The investigations were sent include; Random blood sugar, total serum bilirubin, PCV, serum calcium, chest x-ray if needed, Echocardiogram was done for 4 patients with suspected cardiac disease and blood culture which was done for 3 patients with signs of neonatal sepsis.

The period of their presence in the study setting was ranging from few hours to ten days. Forty-four were discharged well and five need treatment for heart failure and one was died due to birth asphyxia.

Data analysis was done using SPSS (Statistical Package for Social Sciences) software version 26 (IBM Corporation, USA).

3. RESULTS

The study included 50 infants with IDM out of 2000 babies admitted to NICU which represent a total incidence of IDM of (2.5%). Table 3.1 represent the demographic characteristic of the study participants. It's evident that male gender was prevalent among 30 (60%) and female gender was prevalent among 20 (40%) of the study population. Moreover; birth weight of more than 4 Kgs was prevalent among 11 (22%) while birth weight of 2.5-4 Kgs was prevalent among 39 (78%). Gestational age of less than 37 weeks was present among 10 (20%) while the gestational age of 37- 40 weeks was present among 40 (80%) of the study participants. Caesarean section mode of delivery represented 34 (68%) versus normal vaginal delivery represent 16 (32%) of patients. Additionally; diabetes mellitus prior to pregnancy was present among 6 (12%) mothers and gestational diabetes was present among 44 (88%). Lastly; primipara mothers were representing 5 (10) but multipara mothers were representing 45 (90%) of the enrolled patients.

Table 3.1: Demographic information of the study population.

Variable		No.	%	Opposite Variable	No.	%
Gender	Male	30	60	Female	20	40
Birth weight	> 4 Kgs	11	22	2.5- < 4Kgs	39	78
Gestational age	< 37 weeks	10	20	> 37 weeks- 40 weeks	40	80
Mode of delivery	C.S	34	68	NVD	16	32
Type of diabetes	Present before pregnancy	6	12	Gestational diabetes	44	88
Mother parity	Primi	5	10	Multipara	45	90

Figure 3.1 shows signs and symptoms of babies whose having diabetic mothers. Respiratory distress was present among 22 (44%) of the study participants, followed by lethargy which was present among 12 (24%). Moreover; cyanosis, jitteriness, seizure and hypotonia were present among 11 (22%), 10 (20%), 7 (14%) and 3 (6%) respectively.

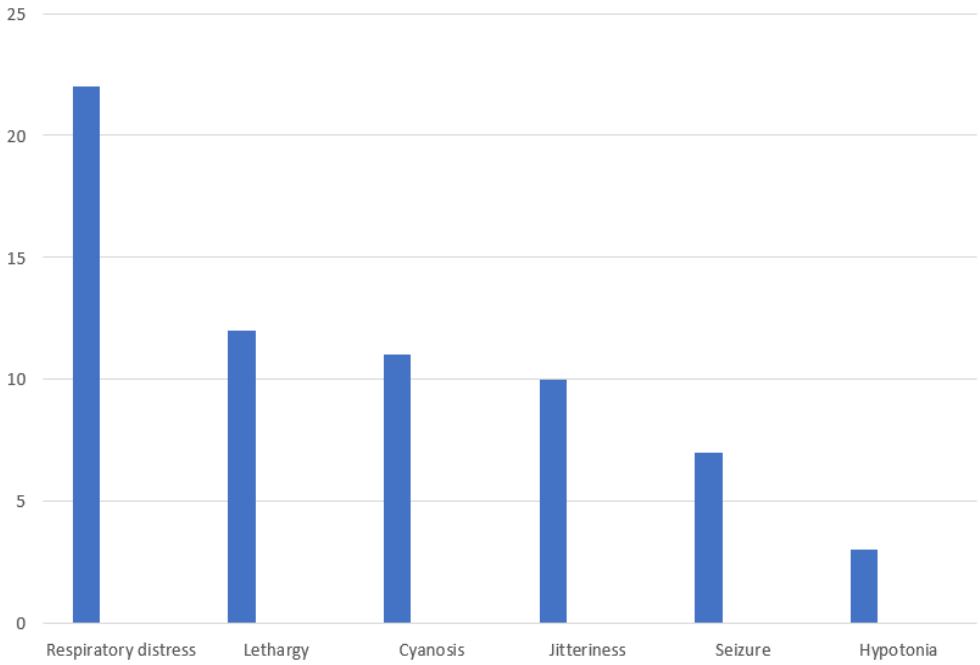

Figure 3.1: Signs and Symptoms of babies whose born from diabetic mothers.

Figure 3.2 illustrates investigation results which were done for the study population. It's evident that hypoglycemia was present among 36 (72%), followed by hyperbilirubinemia among 12 (24%), then polycythemia among 6 (12%). Hypocalcemia was present among 5 (10%), while chest x-ray positive findings (cardiomegaly, respiratory distress syndrome, ground glass appearance with air bronchogram) is prevalent among 15 (30%) followed by Echocardiogram findings (hypertrophic cardiomyopathy with and without small VSD). Lastly; blood culture was positive among 3 (6%) of the study participants.

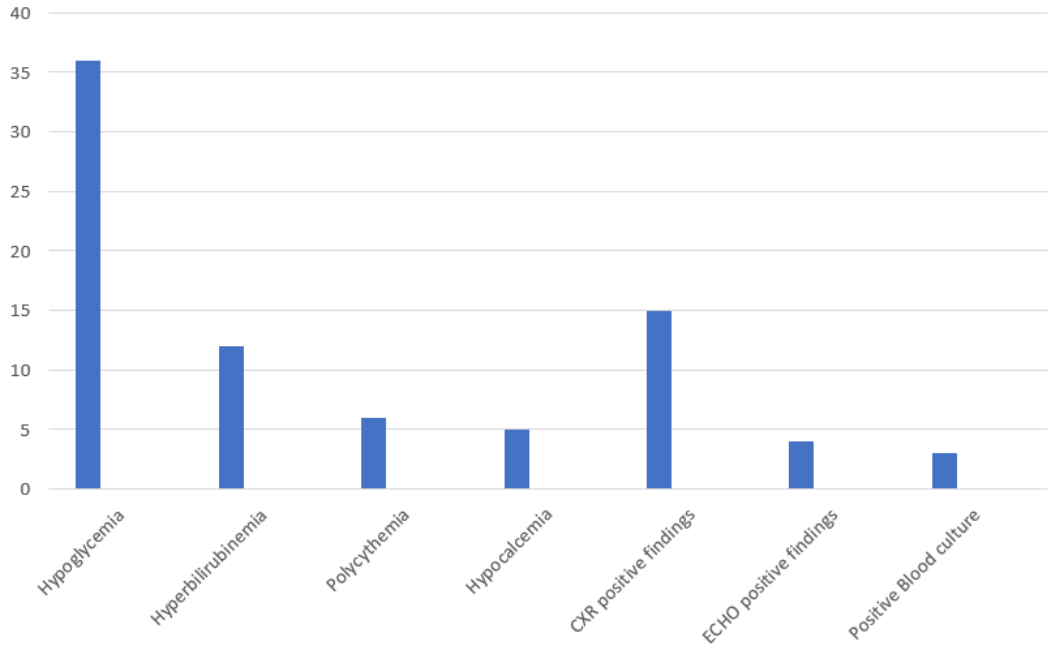

Figure 3.2: Distribution of the study population according to the positive investigation findings.

Table 3.2 shows perinatal complications of babies whose born from diabetic mothers. Birth asphyxia was present among 4 (8%) babies, birth trauma among 3 (6%) and congenital short limbs among 1 (2%).

Table 3.2: Perinatal complications of babies whose born from diabetic mothers.

Complications	No.	%
Birth Asphyxia	4	8
Birth trauma	3	6
Congenital short limbs	1	2

4. DISCUSSION

The study explores total incidence rate of IDM 2.5% which less than the total incidence of IDM in Europe 13.7%.[17] As the study depend on patients admitted to NICU and there are poor antenatal care and screening program in Mosul. From the other hand; male patients are predominant in this study and macrosomia was representing 22% while normal birth weight was representing 78% of the study population which is parallel to a study conducted at Al-Ramadi Teaching Hospital for maternity and childhood.[18] Preterm labor was occurred in 20 % of total patients involved in the study which is consistent with a study done at Pakistan by Syed Bawar Shah et al.[19] Caesarean section and newly diagnosed diabetes were founded to be the predominant mode of delivery and type of diabetes among the study participants which were runs with a study done at neonatal care unit in Karbala pediatric teaching hospital.[20] Additionally; primipara mother was only present among 10% of the study population which are comparable to Moktar Assadi et al study from Libia.[21] The current study explores that the IDM having different signs and symptoms including respiratory distress, lethargy, cyanosis, jitteriness, seizure and hypotonia. Comparable results were obtained from Saudi study which was conducted by Abdulrahman M Al-Nemri et al.[22] Moreover; the study shown different investigations results, such as hypoglycemia, hyperbilirubinemia, polycythemia and Hypocalcemia, also chest x-ray showed positive findings (cardiomegaly, respiratory distress syndrome, ground glass appearance with air bronchogram) in 30% of the study population. Echocardiogram also showed positive findings (hypertrophic cardiomyopathy with and without small VSD). Lastly; blood culture was positive among 6% of the study participants. These results were consistent with Thakaa Zeki Ali et al study findings.[23]

Infants of diabetic mothers are shown to be vulnerable to various perinatal complication. Such as birth asphyxia, birth trauma and congenital short limbs. These results are in the same way of Murali Mohan Voona et al study findings.[24]

When interpreting the findings, it is important to take into account the limitations of the current study. First, the results may not be as easily applicable to different populations due to the small sample size. Second, the study was only carried out at one center, which can have limited the findings' external validity.

5. CONCLUSION AND RECOMMENDATION

A high rate of complications was noted among the infants of diabetic mothers; therefore; these infants should be born in hospitals with specialized neonatal care facilities for managing such complications; additionally, all pregnant women should be screened for gestational diabetes; and, most importantly, the mothers should follow strict glycemic control, appropriate antenatal care, and close infant monitoring to prevent morbidity and mortality which can occurred.

ACKNOWLEDGEMENT

We appreciate the assistance offered by the medical staff at Mosul General hospital and the thorough attention the Nineveh Directorate of Health gave to our study project. This study could not have been done without the assistance of each of these people.

CONFLICT OF INTERTEST

About this study, the authors disclose no conflicts of interest.

REFERENCES

1. 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.
2. Guarnotta V, Mineo MI, Giacchetto E, Imbergamo MP, Giordano C. Maternal-foetal complications in pregnancy: a retrospective comparison between type 1 and type 2 diabetes mellitus. BMC Pregnancy and Childbirth, 2021 Dec; 21: 1-0.
3. ElSayed NA, Aleppo G, Aroda VR, Bannuru RR, Brown FM, Bruemmer D, Collins BS, Hilliard ME, Isaacs D, Johnson EL, Kahan S. 15. Management of diabetes in pregnancy: standards of care in diabetes—2023. Diabetes Care, 2023 Jan 1; 46(Supplement_1): S254-66.
4. Ali TZ, Ajeel NA, Hasan JK. Outcome of newborns with diabetic mothers. Insulin, 2025; 53: 68-8.
5. Chulkov VS, Minina EE, Medvedeva LV. Maternal Diabetes, Respiratory and other Disorders in Offspring: Shortterm and Long-term Outcomes. Current Respiratory Medicine Reviews, 2023 May 1; 19(2): 85-92.
6. Merlob P. CONGENITAL MALFORMATIONS IN DIABETIC PREGNANCY. Textbook of Diabetes and Pregnancy, 2025 Jan 28: 166.
7. Abdullah WH, Atallah M, Ibrahim BA. Assessment of neonatal glycaemic status and comorbidities in infants of diabetic mothers admitted to the neonatal care unit of Al-Ramadi Teaching Hospital for maternity and childhood, Iraq. JPMA, 2024; 74(S151): 8.
8. 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.
9. Jiang L, Tang K, Magee LA, von Dadelszen P, Ekeroma A, Li X, Zhang E, Bhutta ZA. A global view of hypertensive disorders and diabetes mellitus during pregnancy. Nature Reviews Endocrinology, 2022 Dec; 18(12): 760-75.
10. Radwan MA, El Mansori NA, Elfergani MA, Halies FR, Lawgali MA. Neonatal Morbidity Pattern among Infants Born to Diabetic Mothers at Jamhouria Hospital, Benghazi-Libya. Asian J Pediatr Res., 2021; 7(4): 38-55.
11. Nakshine VS, Jogdand SD. A comprehensive review of gestational diabetes mellitus: impacts on maternal health, fetal development, childhood outcomes, and long-term treatment strategies. Cureus, 2023 Oct 23; 15(10).
12. Tschirhart H, Landeen J, Yost J, Nerenberg KA, Sherifali D. Perceptions of diabetes distress during pregnancy in women with type 1 and type 2 diabetes: a qualitative interpretive description study. BMC Pregnancy and Childbirth, 2024 Apr 3; 24(1): 232.
13. Omowunmi AK, Muda SM, Hasan H, Ludin SM, Ibrahim AF. Healthcare Providers' Perceptions on The Provision of Preconception Care for Women with Diabetes in Nigeria. The Malaysian Journal of Nursing (MJN), 2023 Jul 15; 15(1): 48-57.
14. Roeper M, Hoermann H, Kummer S, Meissner T. Neonatal hypoglycemia: lack of evidence for a safe management. Frontiers in Endocrinology, 2023 Jun 8; 14: 1179102.
15. Roeper M, Hoermann H, Kummer S, Meissner T. Neonatal hypoglycemia: lack of evidence for a safe management. Frontiers in Endocrinology, 2023 Jun 8; 14: 1179102.
16. Palmer MG. Hypoglycemia Screening in Term Normal Birth Weight Newborns: A Retrospective Electronic Health Record Review. University of Rhode Island, 2023.
17. Suda-Całus M, Dąbrowska K, Gulczyńska E. Infant of a diabetic mother: clinical presentation, diagnosis and treatment. Pediatric Endocrinology Diabetes and Metabolism, 2024 Jan 1; 30(1): 36-41.
18. Abdullah WH, Atallah M, Ibrahim BA. Assessment of neonatal glycaemic status and comorbidities in infants of diabetic mothers admitted to the neonatal care unit of Al-Ramadi Teaching Hospital for maternity and childhood, Iraq. JPMA, 2024; 74(S151): 8.
19. Shah SB, Bawar S, Farooq N. Common Complications in Infants Born to Diabetic Mothers: Complications in Infants Born to Diabetic Mothers. Pakistan Journal of Health Sciences, 2024 Jan 31; 84-9.
20. Almhanna MG, Easa ZO, Alatwani SH. Morbidity and mortality among infants of diabetic mothers admitted to a neonatal care unit in Karbala pediatric teaching hospital. Journal of Medicine and Life,S 2022 Aug; 15(8): 994.
21. Assadi M, Alburki S, Assadi A, Rajab A, Gadora F. Infants of Diabetic Mothers and Associated Complications in Neonatal Intensive Care Unit in Misurata Center. AlQalam Journal of Medical and Applied Sciences, 2024 Jan 28: 94-102.
22. Al-Nemri AM, Alsohime F, Shaik AH, El-Hissi GA, Al-Agha MI, Al-Abdulkarim NF, Mohamed S. Perinatal and neonatal morbidity among infants of diabetic mothers at a university hospital in Central Saudi Arabia. Saudi medical journal, 2018 Jun; 39(6): 592.
23. Ali TZ, Ajeel NA, Hasan JK. Outcome of newborns with diabetic mothers. Insulin, 2025; 53: 68-8.
24. Voona MM. A study of complications in infants of Diabetic mother. Medical and Research Publication, 2023.