

Mode of Delivery and Fetal Outcome in Women with Diabetes Mellitus

^{1*}Rabar Mohammed Hussein, ²Dalaho Dhahir Hamad , ³Miran Sabah Ibrahim, ⁴Shayda Mohammed, ⁴Sara sherzad, ⁴Sozyar luqman, ⁴Sewa Rostam, ⁴Nishtiman Aziz, ⁴Eman Qasm, ⁴Zubeda Ismael

^{1*} Department of Medical Laboratory Techniques, Noble technical institute, Erbil- Iraq

²Department of Chemistry, Faculty of Science, Firat University, Elazig, Turkey

Chemical engineering department , natural and applied science, van yuzuncu Yil, Van, Turkey

⁴Department of Nursing, Noble technical institute, Erbil- Iraq

Corresponding author: rabarmohammad@yahoo.com

Abstract

Diabetes mellitus is a common clinical syndrome characterized by hyperglycemia caused by absolute or relative deficiency of insulin. This medical condition can affect pregnant women and associated with poor maternal and fetal outcome. Strict glycemic control before and throughout pregnancy will improve outcomes in both mother and baby. The prevalence of diabetes in women of reproductive age is increasing as a consequence of population aging, lifestyle changes and increased obesity rates. To assess maternal and fetal outcome in pregnancies complicated by diabetes mellitus and compare it with control group. To identify and follow a cohort of pregnant women with and without GDM and their offspring to identify determinants and risk factors for GDM A hospital based, case control study, was conducted at Maternity Teaching Hospital, online pages, in Erbil city, the capital of Kurdistan region. The duration of study was from first of March to April 2022. The sample size included 200 pregnant women who were admitted to the labor room. 100 pregnant women with diabetes mellitus (as a case group) at gestational age ≥ 24 week and 100 pregnant women without diabetes mellitus (as a control group) with same gestational age. There were statistically significant difference between cases and controls in relation to maternal age, parity, gestational age, positive family history of DM in first degree relative, previous history of big baby, presence of preeclampsia and polyhydramnios in current pregnancy. Rate of cesarean section was high 74% in diabetic patient compared to 33% in the control group. Pregnancy outcome in DM was still unsatisfactory in term of high maternal, fetal and neonatal complication. Caesarean section was the commonest mode of delivery. Preconceptual counseling and adequate control of blood sugar before and during pregnancy has been associated with improved maternal and prenatal outcome.

Key words: Diabetes mellitus, Pregnancy women, Patient, Erbil

INTRODUCTION

Diabetes is a metabolic disease in which a person has high blood sugar, either because the pancreas does not produce enough insulin or because cells do not respond to the insulin that is produced {1}.

It is important medical condition encountered during pregnancy with between (0.5-5%) of pregnancies being complicated by either preexisting or gestation diabetes. Normal pregnancy has been characterized as a diabetogenic state because of progressive increase in postprandial blood glucose and decreased insulin response in late gestation, because there are rise in hormones that alter insulin metabolism. These hormones include estrogen, progesterone, human placental lactogen and cortisol {2}.

The American Diabetic Association (ADA) classifies DM in to 4 clinical types:

1. Type I diabetes, formerly referred to as insulin-dependent or juvenile onset diabetes.
2. Type II diabetes, formerly referred to as non insulin-dependent or adult onset diabetes.
3. Other specific type of diabetes related to a variety of genetic, drug or chemical induced diabetes.
4. Gestational diabetes mellitus(GDM){3}

	≥ 35	50	50%	10	10%
2	Parity				
	Prime gravid	20	20%	34	34%
	Multiparous	30	30%	42	42%
	Grandmultiparos	50	50%	24	24%

Table (2) shows distribution of diabetic and control groups according to risk factors, The risk factor (family history of diabetes in first degree relative), 69 women of diabetic group (69%) had positive family history of DM compared to 14 women of (14%) non diabetic group. The diabetic and control group in relation to previous history of big baby (> 4 kg). Higher percentages of patients with history of previous big baby were among diabetic women, 40 women (40%) compared to 9 women (9%) of the controls.

Also the diabetic and control group in relation to previous history of missed miscarriage, 43 women (43%) of diabetic group had history of missed miscarriage compared to 13 women (13%) in control group. There was difference between both groups in relation to previous congenital anomaly, but statistically significant difference was found between two groups in relation to previous history of unexplained stillbirth , 18 women (18%) in diabetic group compare to 8 women (8%) in control group.

Table (2): Distribution of diabetic and control groups according to risk factors

No.	Risk factor	Diabetic		Control	
		No.	%	No.	%
1	Family history of DM	69	69%	14	14%
2	Previous history of big baby	40	40%	9	9%
3	Previous history of missed miscarriage	43	43%	13	13%
4	Previous history of unexplained stillbirth	18	18%	8	8%
5	Previous history of congenital anomaly	10	10%	4	4%

Table (3) shows distribution of diabetic and control groups according to presence of maternal complication in current pregnancy, Regarding the presence of pre-eclampsia in current pregnancy there was between diabetic and control group, 35 women (35%) in diabetic group had history of preeclampsia in current pregnancy compared to only 6 women (6%) in control. There was between diabetics and controls in relation to the presence of polyhydramnios in current pregnancy. Higher percentages of polyhydramnios were among diabetic women, 62 women (62%), compared to 3 women (3%) of the control group.

Regarding the presence of preterm delivery, higher percentage were found among diabetic group, 24 women (24%) compared to 4 women (4%) of the control group.

Table (3): Distribution of diabetic and control groups according to presence of maternal complication in current pregnancy

No.	Complication during pregnancy	Diabetic		Control	
		No.	%	No.	%
1	Pre-eclampsia	35	35%	6	6%
2	Polyhydramnios	62	62%	3	3%
3	Preterm delivery	24	24%	4	4%

Figure (1) shows distribution of diabetic according to the type of treatment.

In diabetic group, 27 women (27%) on diet alone, 9 women (9%) on diet and insulin, 35 women (35%) on diet and oral hypoglycemic agent and 29 women (29%) on diet, insulin and oral hypoglycemic agent.

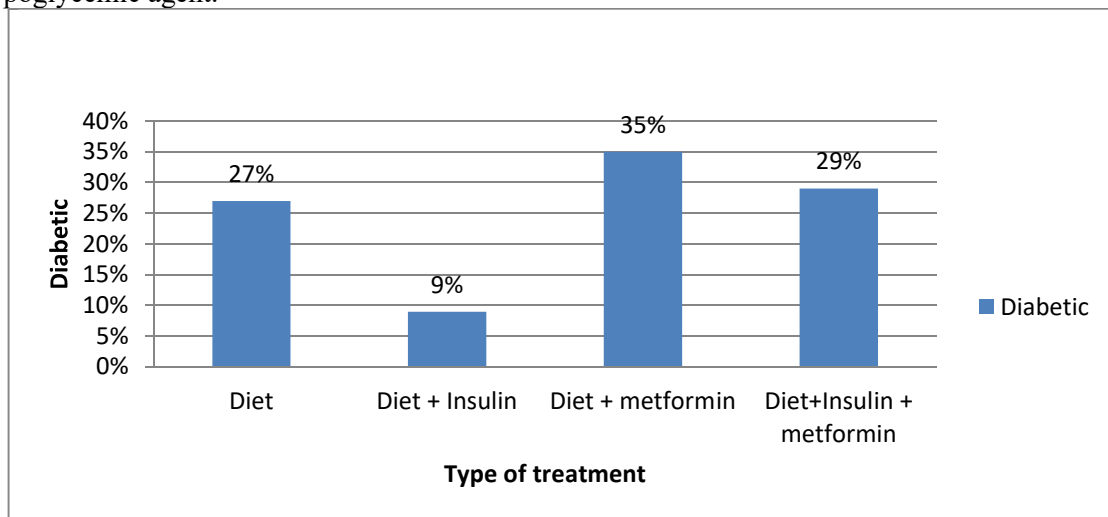


Figure (2): Distribution of diabetic patients according to types of treatment

Figure (3) shows mode of delivery in diabetic and control groups. C/S rate found to be higher among diabetic group, 38 women (38%) delivered by emergency C/S and 36 women (36%) by elective C/S, while in control group 29 women (29%) delivered by emergency C/S and 4% by elective C/S, so there was between both group.

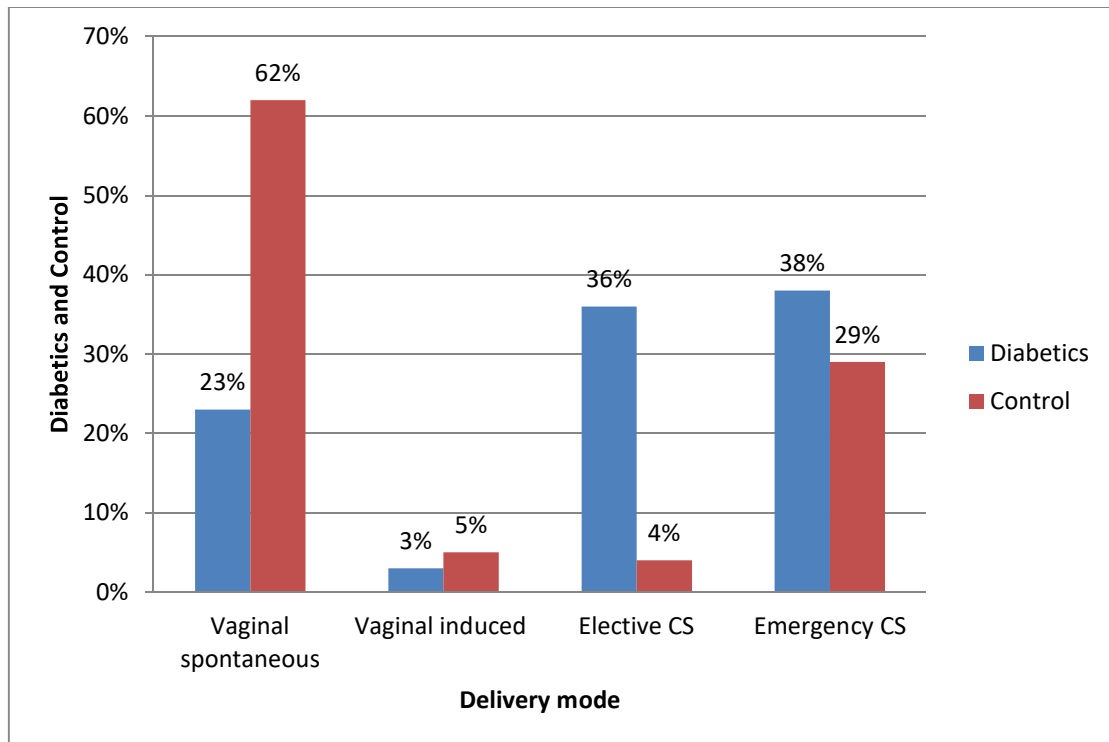


Figure (3) Distribution of diabetic and control groups according to mode of delivery

The control groups in relation to complication of vaginal delivery as shown in Table (4).

Table (4): Distribution of diabetic and control groups according to complication of vaginal delivery

No.	Complications of VD	Diabetics		Control	
		No.	%	No.	%
1	Trauma to birth canal	4	4%	2	2%
2	PPH	0	0%	1	1%

Figure (4) Distribution of diabetic group according to control of blood glucose, There was between control and uncontrolled blood glucose in diabetic group, 77 women (77%) of diabetic women had control blood glucose while 23 women (23%) had uncontrolled blood glucose.

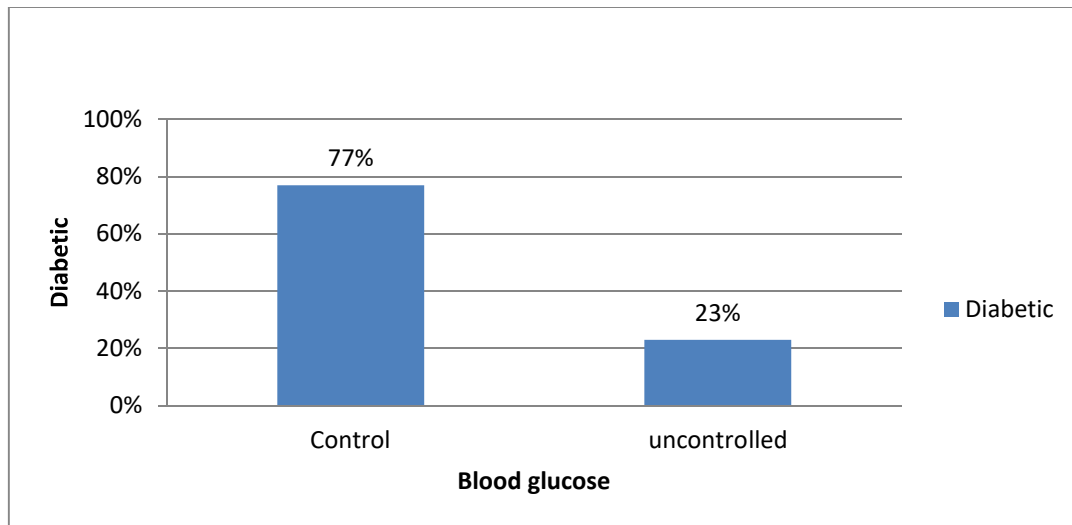


Figure (4) Distribution of diabetic group according to control of blood glucose

Table (5) show fetal outcome in diabetic and control groups. Regarding presence of congenital anomaly, there was no significant difference between diabetic and control, 5 neonate (5%) of diabetic group had obvious congenital anomaly and 1 neonate (1%) of control group had congenital anomaly.

The both group in relation to stillbirth in current pregnancy. There were 7 cases of IUFD among diabetic group (5 macerated stillbirth and 2 fresh stillbirth) while 3 cases in control group. Regarding early neonatal death, the diabetic and control, 5 early neonatal death in diabetic and 2 early neonatal death in non-diabetic group. Regarding the development of jaundice in the neonate during first week of life, between diabetic and control group, 71 neonate (71%) were develop jaundice in diabetic group compared to 38 neonate (38%) in control group.

Table (5): Fetal outcome in diabetic and control groups

N o.	Fetal outcome		Diabetic		Control	
			No.	%	No.	%
1	Obvious congenital anomaly		5	5%	1	1%
2	Still birth		7	7%	3	3%
3	Early neonatal death		5	5%	2	2%
4	Jaundice		71	71%	38	38%
5	Apgar score < 7	First min	5	5%	2	2%
		5 th min	2	2%	1	1%
6	RDS		5	5%	1	1%
7	Hypoglycemia		3	3%	1	1%

DISCUSSION

Pregnant women have considerably altered CHO metabolism, there is progressive glucose intolerance (insulin resistance) with advancing gestation. Recent years have seen a rapid rise in the prevalence of diabetes in pregnancy {8,9}. In this study increasing maternal age (≥ 35 yr) was a risk factor for diabetes during pregnancy, this agrees with the study done by Oder E in Uganda in which the age group at risk of getting diabetes was 20-39 yr, while it does not agree with the study from Netherlands done by Evers IM, which state that age of pregnant women with diabetes did not differ significantly from those pregnant women without diabetes. This study demonstrated that about 50% of patients with diabetes were of high parity (Para 5 and more) and this is parallel to the study done by Alkaban RA in Basrah, which stated that existence of high parity in diabetic group related to early marriage and increasing age, while it does not agree with Oder E, in which the majority of diabetic patients were of low parity.

This study confirmed that family history of diabetes was high among diabetic patients, the same result as the study done by Alkaban RA, in which 65.4% had family history of diabetes {10}. This study illustrated that previous history of missed miscarriages was high among diabetic patients. This is analogous with a study in USA which is done by Sheffield which stated that missed miscarriages may be due to bad counseling of diabetic patient before getting pregnant {11}. Preterm delivery was complicated (24%) of diabetic patients in this study, this was in harmony with other studies for example Gasim T in Saudi Arabia and De Valk in Netherlands in which preterm delivery was high in diabetic patients (21.4%) {12,13}.

In accordance to another studies, this study found that previous history of big baby (>4 kg) was a risk factor for DM, this agrees with the study done by Gasim T. Polyhydramnios was a complication of pregnancy with DM. There was statistically significant difference between diabetic cases and control group, this result agreed with study done by Alkaban RA {8}.

Hypertensive disorders had been complicated about 35% of diabetic cases in this study, this is matching with the result of other study where pre-eclampsia was more frequent among diabetic cases. In this study more than one quarter of the patients were on dietary regime only and 35% of patients were on diet and metformin, so metformin may be considered as an alternative to insulin therapy this is in agreement with study done by Rowan JA in USA which is a recent randomized trial comparing metformin and insulin recently demonstrated no difference in outcomes {14}.

The significantly higher rate of C/S in the diabetic patients compared to the control group may be because of macrosomia, bad obstetrical history and failed induction, this concurs with many studies which found high caesarean delivery rate in diabetic patients despite good maternal blood glucose control during pregnancy {15}.

Congenital malformation affected 5% of diabetic newborns similar to that (5.1%) evident by De Valk in Netherlands, also perinatal mortality in this study was 12% (12 cases), this result was the same as the study done by Sheffield JS³⁴, he concluded in his study that poor glycemic control in early weeks of pregnancy associated with three to four times increase in serious birth defect, such as heart defect and neural tube defect. They are also at increased risk of miscarriage and stillbirth {16}. Although pathogenesis of hyperbilirubinemia in infant of diabetic mother is uncertain, polycythemia may be a risk factor influencing it. The result of this study is in agreement with the result of study done by Hawthorn G in which development of jaundice in first week was high {16,17}.

CONCLUSION

DM is a major medical disorder that exhibits burden on health for both mother and fetus. The most important risk factors for developing DM during pregnancy were high parity, advanced maternal age, positive family history of diabetes in first degree relative, previous history of big baby (> 4 kg) and history of missed miscarriage. Caesarean section was the commonest mode of delivery in diabetic patients. Pregnancy complication like pre-eclampsia, polyhydramnios and preterm labour were high among diabetic group. Although there was statistically no significant difference between both groups in relation to fetal outcome, babies of mother with DM were more likely to be stillborn, have congenital malformation and jaundice than those of normal mother. There is strong evidence which suggests that the reduction of complications can be significantly achieved by good screen, control and treatment of diabetes before and during pregnancy.

REFERENCES

1. Van Assche FA, Aerts L. Diabetes and pregnancy, first edition, Elsevier 2004; 9-152.
2. Decherney AH, Nathan L, Roman AS, Laufer N. "Diabetes Mellitus & Pregnancy", Current obstetrics and gynaecologic diagnosis and treatment, McGraw Hill. 11th ed. 2013; 509-518.
3. Gallahan TL, Caughey AB. "Diabetic during Pregnancy", Blue prints OBESTETRICS AND GYNECOLOGY, 5th ed. Philadelphia: Lippincott Williams and Wilkins, 2009; 09: 103
4. James DK, Steer PJ, Weiner CP, Gonik B. "Diabetes", HIGH RISK PREGNANCY management options, 4th ed. Philadelphia: Elsevier, 2011; 44: 795-811.
5. Hussein RM, Koyun M, Şen B, Sönmez F. Phycological Study on Water Bodies of Two Major Parks in Erbil Province (North Iraq). Fresenius Environmental Bulletin. 2019 Jan 1; 28:8855-6.
6. Hussein RM. Effects of iron application to soil on growth and yield of broad bean plant in Erbil city of north Iraq. Russian Journal of Agricultural and Socio-Economic Sciences. 2019; 11(95):197-9.
7. Hussein RM. Water quality assessment in some ponds by using algae in Erbil province, north Iraq. Russian Journal of Agricultural and Socio-Economic Sciences. 2019; 95(11).
8. Baker PN, Kenny LC. "Medical disease complicating pregnancy", OBESTETRIC by ten teachers, 19th ed. London: Hodder Arnold, 2011; 12:162-16
9. Diana Hamilton –Fairly .Lecture notes: Obstetrics and Gynecology 2005. chapter 11, 147-150.
10. Kliegman RM, Marcantone KJ, Jenson HB, Behrman RE. "Maternal Diseases Affecting the Newborn", Essentials Of Pediatrics, 5th ed. Philadelphia: Elsevier, 2006; 58:300.
11. Cunningham FG, Leveno KJ, Bloom SL, Hauth JC, Gilstrap LC, Wenstrom KD. "Diabetes", Williams OBESTETRICS, 23th ed. New York: McGraw-Hill, 2010; 52:1104-1120.
12. Philips AF, Dubin JW. Obstetrics and Gynecology. *Diabetes in pregnancy*. 2005; 16: 135.
13. American College of Obstetricians and Gynecologists: Gestational diabetes. Practice Bulletin No. 30, September 2001.
14. Growther CA, Hiller JE, Moss JR, et al ; Effects of treatment of gestational diabetes mellitus on pregnancy outcomes ; N Engl J med. 2005 Jun 16; 352(24):2477-89.
15. Mishell DR, Goodwin TM, Brenner PF. "Diabetes During Pregnancy", Management of common problems in Obstetrics and Gynecology, 4th ed. Blackwell, 2002; 9:40-43.
16. Colledge NR, Walker BR, Ralston SH. "Diabetes mellitus", Davidson's principles and practice medicine, 21st ed. London: Elsevier, 2010; 21: 806.
17. CEMACH. Confidential Enquiry into Maternal and Child Health 2005. Pregnancy in women with type1 and type2 diabetes in 2002-3. England, Wales and Northern Ireland. London, 2005.