JOURNAL OF
CONTEMPORARY MEDICINE

DOI:10.16899/jcm.1202083
J Contemp Med 2023;13(1):114-120

Original Article / Orijinal Araştırma

Maternal Characteristics and Complications in Pregnancies Complicated with Diabetes

Diyabetle Komplike Olmuş Gebeliklerde Maternal Özellikler ve Komplikasyonlar

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Abstract

Aim: Pregnancies complicated with diabetes are risky pregnancies with different maternal characteristics and increased maternal complications compared to the normal pregnant group. In this study, it is aimed to determine maternal characteristics and maternal complications in pregnant women with different glucose intolerance or blood glucose levels, and to compare them with the information in the literature and to investigate the effectiveness of our follow-up and treatment protocols.

Material and Method: This study is carried out with 223 patients at **XXXXXX** Training and Research Hospital between May 2009 and March 2010. Group 1 in the study, normal glycemic group; Group 2, group with 1 value higher in 100 g oral glucose tolerance test (OGTT); Group 3, gestational diabetes mellitus (GDM), is the blood sugar regulated group; Group 4, the uncontrolled group diagnosed with GDM and whose blood sugar is not regulated; Group 5 consisted of patients with pregestational diabetes mellitus, with or without regulated blood sugar.

Results: Considering the maternal characteristics, it is seen that the age, gravida, parity, body mass index (BMI) of Group 3, Group 4 and Group 5 patients are significantly higher than the patients in Group 1 and Group 2. The rates of preeclampsia, macrosomic baby and preterm birth are significantly higher in groups 4 and 5. In terms of delivery types, normal birth rate is high in Group 1, while cesarean section rates are high in Groups 4 and 5. According to the groups, the cases with a 1st minute apgar score less than 7 are significantly higher in Group 4 and Group 5.

Conclusion: It is revealed that different glucose intolerances cause some problems in pregnancy, increase complications, and uncontrolled blood glucose levels increase these problems and complications. In pregestational and gestational periods; In such cases, it should be aimed and ensured that these problems and complications are reduced to the lowest possible level with appropriate diagnosis and treatment approaches.

Keywords: Gestational diabetes mellitus, high risk pregnancy, maternal outcomes

Öz

Amaç: Diyabetle komplike olmuş gebelikler normal gebe grubuna göre farklı maternal özellikler ve artmış maternal komplikasyonların olduğu riskli gebeliklerdir. Biz bu çalışmada farklı glukoz intoleransları veya kan glukoz düzeylerine sahip gebelerde maternal özellikleri ve maternal komplikasyonları saptamayı, bunları literatürdeki mevcut bilgilerle kıyaslıyarak takip ve tedavi protokollerimizin etkinliğini araştırmayı amaçladık.

Gereç ve Yöntem: Bu çalışma Mayıs 2009 ve Mart 2010 tarihleri arasında **XXXXXX** Eğitim ve Araştırma Hastanesi'nde 223 hasta ile gerçekleştirildi. Çalışmada Grup 1, normal glisemik grub; Grup 2, 100 gr oral glukoz tolerans testinde (OGTT) 1 değer yüksek grup; Grup 3, gestasyonel diyabetes mellitüs (GDM) olup kan şekeri regüle grup; Grup 4, GDM tanısı alıp kan şekeri regüle olmayan kontrolsüz grup; Grup 5, Pregestasyonel diyabetes mellitüslu, kan şekeri regüle veya regüle olmayan hastalardan oluşmaktaydı.

Bulgular: Maternal özelliklere bakıldığında Grup 3, Grup 4 ve Grup 5 hastaların Grup 1 ve Grup 2'de ki hastalara göre yaş, gravida, parite, vücut kitle indeksleri (VKİ)'leri, karşılaştırıldığında anlamlı yüksek olduğu görüldü. Grup 4 ve 5'te preeklampsi, makrozomik bebek, preterm doğum görülme oranları anlamlı derecede yüksekti. Doğum şekilleri açısından normal doğum oranı Grup 1'de yüksekken, sezaryan oranları Grup 4 ve 5'te yüksekti. Gruplara göre Grup 4 ve Grup 5'te 1. Dakika apgar skoru 7'den küçük olgular anlamlı yüksekti.

Sonuç: Farklı glukoz intoleranslarının gebelikte bir takım sorunlara yol açtığı, komplikasyonları artırdığı, kontrolsüz kan glukoz düzeylerinin bu sorun ve komplikasyonları daha da artırdığını ortaya koyduk. Pregestasyonel ve gestasyonel dönemlerde; bu tür olgularda, uygun tanı ve tedavi yaklaşımları ile bu sorun ve komplikasyonların mümkün olabilecek en düşük düzeye indirilmesi hedeflenmeli ve sağlanmalıdır.

Anahtar Kelimeler: Gestasyonel diabetes mellitus, yüksek riskli gebelik, maternal sonuçlar

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Received *(Geliş Tarihi)*: 11.11.2022 **Accepted *(Kabul Tarihi)*:** 25.01.2023

INTRODUCTION

Gestational Diabetes Mellitus; It is any degree of glucose intolerance that is diagnosed for the first time during pregnancy or that occurs during pregnancy.[1,2] If it is diagnosed before pregnancy, it is called pregestational diabetes mellitus.[3] About 7% of all pregnancies are complicated by diabetes, and 86% of them occur as GDM. [2] The prevalence of GDM varies according to social characteristics as well as the diagnostic tests and criteria used.

Two different approaches can be used in GDM screening: single (75 g OGTT) and two-step (50 g scan and 100 g OGTT) methods.[4] The two-step approach frequently used in GDM screening is based on the detection of venous blood glucose at 1 hour following ingestion of 50 g of oral glucose solution at the initial screening. Women whose glucose levels reach or exceed the laboratory threshold value are then given a 3-hour 100 g OGTT as a diagnostic test. The diagnosis of GDM is usually made with 2 or more abnormal values in the 3-hour OGTT.[5,6]

Decreased insulin sensitivity during pregnancy; It is attributed to the increase in placental and maternal hormones such as human placental lactogen, progesterone, estrogen, cortisol and prolactin, leptin, tumor necrosis factor-alpha (TNF-alpha) and resistin.[7]

As a result of increasing insulin resistance during pregnancy, the amount of insulin secreted from the pancreas to provide maternal euglycemia increases more than two times compared to non-pregnant women. While this situation can be tolerated physiologically in normal pregnant women, it cannot be compensated during pregnancy in diabetic women and many women who are not known to have diabetes before, and the balance of carbohydrate metabolism is disturbed.[8]

Pregnancies complicated by diabetes are risky pregnancies that require close follow-up from both maternal and fetal aspects. After the discovery of insulin by Banting and Best in 1921, maternal and perinatal mortality in diabetic women, which is quite high until that day, has now approached the levels in normal pregnancies, especially except for malformations.[9] GDM has negative effects on maternal health such as increased risk of preeclampsia, increased cesarean delivery rate and increased risk of type 2 diabetes in later life.[10,11]

In this study, it is aimed to determine the maternal characteristics and maternal complications related to a total of 5 groups of pregnant women with different glucose intolerance or blood glucose levels, whose births are performed in our clinic, and to compare these with the existing information in the literature and to investigate the effectiveness of our follow-up and treatment protocols.

MATERIAL AND METHOD

This study is carried out between 11 May 2009 and 11 March 2010 at **XXXXXX** Training and Research Hospital, Gynecology Clinic. The study was carried out with the permission of Ümraniye Training and Research Hospital Ethics Committee (Date: 10.03.2010). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki. This study includes a total of 223 pregnant women and their babies, who are followed up and treated in the obstetrics clinic and delivery room, and delivered in our hospital. In order to investigate maternal characteristics and complications in different levels of glucose intolerance, 5 groups of pregnant women are compared.

Group 1 (normoglycemic) consisted of 85 patients with normol glucose level. Pregnant women with 50 g glucose screening test above 140 mg/dl but not exceeding any threshold value in 100 g OGTT are included in this group. Group 2 consisted of 44 patients with only one elevation in 100 g OGTT, exceeding 140 mg/dl in the 50 g glucose screening test. Group 3, those whose 50 g glucose screening test result is 140 mg/dl and above, 100 g OGTT is performed, and those who have at least two values higher or those whose 50 g scan result is above 180 mg/dl are followed up and treated in our clinic and their blood sugar is regulated with diet or insulin. It consisted of 52 patients. The values suggested by Carpenter and Causton are taken as the basis for the threshold values in OGTT.[5] Group 4 consisted of 24 uncontrolled patients who are diagnosed with gestational DM and delivered in our clinic, but did not have follow-up and treatment and blood sugar regulation is not provided. Group 5 consisted of 18 patients with pregestational DM, blood glucose control or uncontrolled due to lack of follow-up.

Diabetic pregnant women are started on a diet in consultation with a dietitian. Patients with persistently high blood glucose levels for 1-2 weeks although diet and exercise are hospitalized. Insulin therapy is started for the patients whose fasting blood glucose is 95 mg/dl and 1 hour postprandial blood glucose is above 140 mg/dl.

No treatment is given to the pregnant women in group 1 and group 2. The pregnant women included in the study are randomly selected among those who applied to the obstetric follow-up outpatient clinics and have singleton pregnancy. Those with chronic hypertension and high blood pressure in the first trimester, those with a history of drug use that may cause deterioration in glucose metabolism, and those with multiple pregnancies are not included in the study.

While evaluating the findings obtained in the study, NCSS (Number Cruncher Statistical System) 2007&PASS 2008 Statistical Software (Utah, USA) program is used for statistical analysis. While evaluating the study data, in addition to descriptive statistical methods (Mean, Standard deviation), the Oneway Anova test is used for the comparison of the normally distributed parameters in the comparison of the quantitative data, and the Tukey HSD test is used to determine

the group that caused the difference. The Kruskal Wallis test is used for the comparison of the parameters that did not show normal distribution, and the Mann-Whitney U test is used to determine the group that caused the difference. Chi-square test is used to compare qualitative data. Significance is evaluated at the p<0.05 level.

RESULTS

There is a statistically significant difference between the groups according to the ages (p<0.01). As a result of the Post-Hoc Tukey HSD test, which is conducted to determine which group the significance originated from; It is determined that the mean age of Group 1 and Group 2 is significantly lower than Group 3, Group 4 and Group 5 (p:0.043; p:0.009).

There is a statistically significant difference between pre-pregnancy BMI measurements according to the groups (p<0.01). As a result of the Post-Hoc Tukey HSD test, which is conducted to determine which group the significance originated from; The mean BMI of Group 1 is significantly lower than the other groups (p:0.019; p:0.001; p:0.001; p:0.001); Group 2 is also found to be significantly lower than Group 5 (p:0.006).

There is a statistically significant difference between the numbers of gravida according to the groups (p<0.05). As a result of the pairwise comparisons made in order to determine which group the difference originates from; The number of gravida in Group 1 is significantly lower than Group 3, Group 4 and Group 5 (p:0.026; p:0.034; p:0.009); The number of gravida in Group 2 is also found to be significantly lower than Group 5 (p:0.029).

There is a statistically significant difference between the parity numbers according to the groups (p<0.05). As a result of the pairwise comparisons made in order to determine which group the difference originates from; It is determined that the parity number of Group 1 and Group 2 is significantly lower than Group 3, Group 4 and Group 5 (p:0.022; p:0.026; p:0.023).

There is no statistically significant difference between the number of abortions according to the groups (p>0.05). (**Table 1**)

There is a statistically significant difference between the groups with a family history of DM (p<0.01); The rate of family history in Group 3, Group 4 and Group 5 is significantly higher than the other groups.

According to the groups, there is no statistically significant difference between the incidence of large babies in previous pregnancy (p>0.05).

There is a statistically significant difference between the incidence of stillbirth in previous pregnancies according to the groups (p<0.05); In Group 3 and Group 4, the rate of stillbirth in previous pregnancies is significantly higher than the other groups. (**Table 2**)

There is a statistically significant difference between the weeks of birth according to the groups (p<0.01). As a result of the Post-Hoc Tukey HSD test, which is conducted to determine which group the significance originated from; It is determined that the birth week of group 4 is significantly lower than the other groups (p:0.001; p:0.024).

There is a statistically significant difference between the birth weight averages according to the groups (p<0.05). As a result of the Post-Hoc Tukey HSD test, which is conducted to determine which group the significance originated from; It is determined that the mean birth weight of Group 5 is significantly higher than Group 1, Group 2 and Group 3 (p:0.017; p:0.026; p:0.039).

There is no statistically significant difference between the cases of presentation anomaly according to the groups (p>0.05).

Table 1. Evaluation of pregnancy characteristics according to groups

	Group 1	Group 2	Group 3	Group 4	Group 5	p
	Mean±SD (Median)	Mean±SD (Median)	Mean±SD (Median)	Mean±SD (Median)	Mean±SD (Median)	
Age (years)	28.65±5.28	28.06±5.93	31.88±5.61	32.21±5.57	33.5±7.47	0.001**
BMI Pre-Pregnancy	23.74±3.68	26.0±4.22	27.98±4.41	28.04±3.23	29.78±3.68	0.001**
Gravida	2.47±1.68 (2)	2.43±1.42(2)	2.86±1.34 (3)	3.16±2.03 (3)	3.05±0.99 (3)	0.015*
Parity	2.16±1.14 (2)	2.09±1.19(2)	2.59±1.22(2.5)	2.83±1.57 (3)	2.71±1.04 (3)	0.010*
Abortion history	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**n (%)**	
Yes	15 (17.6%)	9 (20.5%)	10 (19.2%)	5 (20.8%)	6 (33.3%)	0.679
No	70 (82.4%)	35 (79.5%)	42 (80.8%)	19 (79.2%)	12 (66.7%)	

Kruskal Wallis test is used, aChi-Square test, *p<0.05, **p<0,01

Table 2. Evaluation of previous pregnancy histories according to groups

	Group 1 n (%)	Group 2 n (%)	Group 3 n (%)	Group 4 n (%)	Group 5 n (%)	p
DM Family History	12 (14.1%)	8 (18.2%)	28 (53.8%)	12 (50%)	13 (72.2%)	0.001**
Big baby in previous pregnancy	4 (4.7%)	4 (9.1%)	7 (13.5%)	3 (12.5%)	4 (22.2%)	0.158
Stillbirth in a previous pregnancy	1 (1.2%)	0	6 (11.5%)	3 (12.5%)	1 (5.6%)	0.013*

Chi-square test is used., *p<0.05, **p<0.01

Table 3. Evaluation of descriptive features by groups

	Group 1	Group 2	Group 3	Group 4	Group 5	p
	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	
Birth Week	39.26±1.35	38.99±1.94	38.94±1.24	37.71±2.79	38.94±1.21	0.003**
Birth Weight (gr)	3277.8±456.1	3262.9±647.8	3298.8±560.7	3312.1±1037.0	3786.1±750.2	0.033*
	n (%)	n (%)	n (%)	n (%)	n (%)	
Presentation anomaly	2 (2.4%)	4 (9.1%)	4 (7.7%)	4 (16.7%)	2 (11.1%)	0.141
Type of Birth						
Cesarean section	28 (33.3%)	22 (50%)	25 (48.1%)	17 (70.8%)	11 (61.1%)	0.010*
Normal	56 (66.7%)	22 (50%)	27 (51.9%)	7 (29.2%)	7 (38.9%)	

Oneway ANOVA test is used, aChi-square test, *p<0,05, **p<0,01

There is a statistically significant difference between the delivery types according to the groups (p<0.05); While the rate of Group 1 is high in cases with normal delivery, the rate of Group 4 and Group 5 is high in cases with cesarean section. (**Table 3**)

There is a statistically significant difference between the cesarean section indications according to the groups (p<0.05); While the rate of old cesarean section is high in Group 1, Group 2 and Group 3, the rate of large babies is high in Group 4 and Group 5. (**Table 4**)

Table 4. Evaluation of cesarean section indications according to groups

	Group 1 n (%)	Group 2 n (%)	Group 3 n (%)	Group 4 n (%)	Group 5 n (%)
Old cesarean section	17 (58.)	9 (40.9)	16 (64)	1 (6.3)	5 (45.4)
Fetal distress	3 (10.3)	2 (9.1)	2 (8)	3 (18.8)	1 (9.1)
Big baby	1 (3.4)	4 (18.2)	4 (16)	7 (43.8)	3 (27.2)
Presentation anomaly	2 (6.9)	4 (18.2)	3 (12)	4 (25)	1 (9.1)
Other	6 (20.7)	2 (9.1)	0	0	0

Chi-square test is used, *p<0,05

There is a statistically significant difference between the incidence of prematurity according to the groups (p<0.01); The incidence of prematurity in Group 4 and Group 5 is significantly higher than the other groups.

There is a statistically significant difference between the incidence of macrosomia according to the groups (p<0.01); The incidence of macrosomia in Group 4 and Group 5 is significantly higher than the other groups.

There is a statistically significant difference between the incidence of preeclampsia according to the groups (p<0.01); The incidence of preeclampsia in Group 4 and Group 5 is significantly higher than the other groups.

There is a statistically significant difference between the stillbirth cases according to the groups (p<0.05); The stillbirth rate in Group 5 is significantly higher than the other groups. (**Table 5**)

Table 5. Evaluation of some results by groups

	Group 1 n (%)	Group 2 n (%)	Group 3 n (%)	Group 4 n (%)	Group 5 n (%)	p
Prematurity	2 (2.4)	3 (6.8)	3 (5.8)	6 (25)	2 (11.1)	0.006**
Macrosomia	1 (1.2)	5 (11.4)	5 (9.6)	9 (37.5)	7 (38.9)	0.001**
Preeclampsia	1 (1.2)	3 (6.8)	4 (7.7)	6 (25)	5 (27.8)	0.001**
Stillbirth	1 (1.2)	1 (2.3)	0	0	2 (11.1)	0.033*

Chi-square test is used, *p<0,05, **p<0,01

DISCUSSION

In general, some features are seen more frequently in diabetic pregnant women than in pregnant women with normal glucose levels. Advanced age, increased prepregnancy body mass index (BMI), parity, family history of diabetes, bad obstetric history and macrosomic baby delivery are more common in diabetic pregnant women.[12-14]

In our study, it is determined that the mean age of Group 1 and Group 2 is significantly lower than Group 3, Group 4 and Group 5. This result is similar to the opinion of selective screening for people over 25 years old in the absence of other risk factors suggested in the Fourth International Gestational Diabetes Workshop.[12] In our study, the gravida and parity numbers of Group 1 are determined from Group 3, Group 4 and Group 5; In Group 2, the number of gravida and parity is found to be significantly lower than Group 5, in parallel with the increased mean age.

The familial history in people with type 2 diabetes is remarkable. Co-occurrence of monozygotic twins is 100%. Abnormal glucose tolerance or overt diabetes develops in 40% of siblings and one-third of children. If both parents are diabetic, this rate rises to 60-75%. There is a similar familial predisposition in GDM, which progresses with insulin resistance in target tissues.[4,15] In our study, we investigated the history of diabetes in first-degree relatives of pregnant women. As the degree of glucose intolerance increased, we found a higher family history. The incidence of family history for diabetes in Group 3, Group 4 and Group 5 is significantly higher than Group 1 and Group 2. 14% of Group 1, 18% of Group 2, 53% of Group 3, 50% of Group 4, 72% of Group 5 have a positive family history.

Another feature of diabetic pregnant women is that obesity rates in these pregnant women are higher than those with normol glycemic level. The American Diabetes Association and ACOG recommend that all women who are obese and overweight and have one or more of the specified risk factors should have a screening test planned at the first antepartum visit.[16] As BMI increases, the risk of developing Type 2 diabetes and varying degrees of glucose intolerance increases. While this risk is approximately 4-5 times higher at 27 kg/m², it becomes 40 times higher at 35 kg/m².[17,18] Parallel to the studies performed, there is a statistically significant difference between pre-pregnancy BMI measurements according to the groups in our study. We found that the mean BMI of Group

1 is significantly lower than the other groups, and Group 2 is significantly lower than Group 5. Group 1 mean BMI is 23.7 kg/m², Group 2 mean BMI is 26.0 kg/m², Group 3 mean BMI is 27.9 kg/m², Group 4 mean BMI is 28.0 kg/m², mean BMI of Group 5 is 29.7 kg/m².

Insufficient glycemic control in the periconceptional period and in the first trimester has been found to be associated with spontaneous abortions in some prospective studies.[9,19] In our study, we questioned the history of abortion in the previous pregnancies of the pregnant women and we did not find a significant difference between the groups. In this study, when it is investigated that the history of giving birth to a large baby in previous pregnancies in the groups, it is found that the history of giving birth to a baby of 4000 g and above increased as the degree of glucose intolerance increased. It is found a statistically significant difference between the groups with a history of stillbirth in the previous pregnancy. The rate of stillbirth in Group 3, Group 4 and Group 5 is significantly higher than the other groups.

In pregnancies complicated with diabetes, especially in the presence of overt diabetes before pregnancy, some fetal and maternal complications are observed more frequently and many pregnancies are terminated in earlier weeks due to these complications. In addition, since the incidence of macrosomia and unexplained fetal losses gradually increases in the advancing gestational weeks, most of the physicians do not expect spontaneous labor and generally terminate the pregnancy with induction or cesarean section.[19-22] These reasons explain the increased cesarean and preterm birth rates in pregnancies accompanied by diabetes. On the other hand, regardless of diabetes-related complications, Monique M. Hedderson et al. found different degrees of glucose intolerance to be associated with spontaneous preterm delivery.[23] In our study, mean week of delivery is 39.2 weeks in Group 1, mean week of delivery is 38.9 weeks in Group 2, mean week of delivery is 38.9 weeks in Group 3, mean week of delivery is 37.7 weeks in Group 4, mean week of delivery is found to be 38.9 weeks in Group 5. It is determined that the birth week of group 4 is significantly lower than the other groups.

Preeclampsia is seen in approximately 6% of the general pregnant population and is one of the most important complications of pregnancy. Sibai et al. reported that preeclampsia is encountered 2-3 times more frequently in pregnant women w ith pregestational diabetes.[24] Preeclampsia is seen in up to 50% of patients with diabetic nephropathy.[9] Many studies suggest that varying degrees of insulin resistance and glucose intolerance may play a role in the pathogenesis of pregnancy-induced hypertension.[9,19,25,26] In this study, it is found a statistically significant difference between the incidence of preeclampsia according to the groups. The incidence of preeclampsia in Group 4 and Group 5 is significantly higher than the other groups. It is found that preeclampsia of 1.2% of Group 1, 6.8% of Group 2, 7.7% of Group 3, 25% of Group 4, 27% of Group 5.

In our study, there is no statistically significant difference between the presentation anomaly according to the groups ($p>0.05$). This result is consistent with what Noraihan et al. reported.[21] Yang et al., published in 2002, reported that presentation anomaly rates are more common in pregnancies with impaired glucose tolerance compared to normoglycemic pregnancies.[27]

In our study, a statistically significant difference is found between the delivery types according to the groups, while the rate of Group 1 is found to be high in cases who have normal delivery, while the rate of Group 4 (70.8%) and Group 5 (61.1%) is found to be high in cases who have cesarean section.

One of the most important complications in diabetic pregnancies is fetal macrosomia. While it is seen in 8-14% of non-diabetic patients, it is seen in 25-40% of diabetics.[19,28] In this study, it is considered that babies born 4000 g and over to be macrosomic, regardless of the week of birth. Macrosomia is 3.5% in Group 1, 11.4% in Group 2, 13.3% in Group 3, 37.5% in Group 4, 38.9% in Group 5 detected. Accordingly, it is found that the incidence of macrosomia in Group 4 and Group 5 is significantly higher than the other groups. In parallel with our study, many clinical series revealed that the incidence of macrosomia decreased with tight maternal glucose control. Kitzmiller and Cloherty reported the rate of infants with a birth weight over 4000 g in 134 women with fasting blood glucose levels between 105-121 mg/dl as 11%.[29] This rate drops more dramatically when physiological control is achieved. Roversi and Gargiulo applied the maximum tolerated insulin administration program and found a 6% macrosomia rate. [30] Using capillary glucose values at the 2nd and 3rd months, Landon et al. determined the rate of macrosomia as 3% in women with an average glucose level of 110 mg/dl, and 34% in those with less control.[31]

Overt diabetes existing before pregnancy is a risk factor for preterm birth. In this study, it is found a statistically high level of significance between the incidence of prematurity according to the groups, and the rate of prematurity in Group 4 and Group 5 is significantly higher than the other groups. Sibai et al. analyzed the pregnancy outcomes of 461 women with pregestational diabetes and found that 9% of the women gave birth spontaneously at or before 34 weeks. This rate is 2% in non-diabetic women.[32]

The most feared complication in diabetic pregnancies is the unexplained death of the baby in the womb in the later weeks of pregnancy. A total of 4 stillbirths occurred in our study groups. 1 (1.2%) of these occurred in Group 1, 1 (2.3%) in Group 2, and 2 (11.1%) in Group 5. The stillbirth rate in group 5 is significantly higher than the other groups. The reason for the increase in stillbirth rate in diabetic pregnant women is unknown. Chronic intrauterine hypoxia has been reported as the cause of intrauterine death, since extramedullary hematopoiesis is common in stillborn infants of diabetic mothers. Studies performed on fetal umbilical cord blood

samples of pregnant women with type 1 diabetes have shown the presence of relative fetal erythremia and lactic acidemia. Salvasen et al. reported that fetal pH decreased and CO_2, lactate and erythropoietin values increased in diabetic pregnancies.[33] Maternal diabetes can alter erythrocytes oxygen release and placental flow. It has been stated that changes in fetal carbohydrate mechanism may cause intrauterine asphyxia.[34]

As a result, in this descriptive prospective study, it is demonstrated again with this study that different glucose intolerances cause some problems in pregnancy, increase complications, and uncontrolled blood glucose levels increase these problems and complications. When we compile and collectively present the data of these pregnant women, whom we frequently follow in our hospital, it has been understood much more clearly that pregnant women complicated with diabetes are indeed in the high-risk pregnancies class. It should be kept in mind that various complications such as preeclampsia, fetal death, prematurity, macrosomia, higher cesarean section rates are more common in these pregnancies complicated with diabetes, and risky pregnant women should be screened and treated at early gestational weeks. In pregestational and gestational periods; In such cases, it should be aimed and ensured to minimize the problems and complications that may be encountered with appropriate diagnosis and treatment approaches.

ETHICAL DECLARATIONS

Ethics Committee Approval: The local ethics committee approved this study of Umraniye Training and Research Hospital, Turkey (10.03.2010)

Informed Consent: Because the study was designed retrospectively, no written informed consent form was obtained from patients.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

Author Contributions: All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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