

# Diabetes and perinatal loss

## *A continuing problem*

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### ABSTRACT

**Objective:** To determine the fetal outcome in diabetic pregnant patients managed exclusively by the obstetrician at King Faisal Military Hospital in the south-west region of Saudi Arabia, and to compare this with the non-diabetic control group in the same hospital.

**Methods:** Case-control study of 83 diabetic and non-diabetic pregnant patients who delivered at King Faisal Military Hospital over a 2 year period.

**Results:** The perinatal mortality rate in diabetic patients was 6.02% while that in the non-diabetic control group was 1.2%. However, the difference was not statistically significant,  $p > 0.05$ . There was no significant difference in the mean birth weight between the cases and control;

$p > 0.05$  but the cesarean section rate was 5 times higher in the cases than in the controls. This was statistically significant; OR=5.22 (1.90-16.48).

**Conclusion:** Diabetes in pregnancy is still a major cause of perinatal loss in our community. The increase in cesarean section in diabetic pregnant patients also indicates a drain in the financial resources. It is recommended that emphasis should be placed on health education in order to reduce the cost of child birth as this condition may be prevented.

**Keywords:** Diabetes, perinatal loss, continuing problem.

**Saudi Medical Journal 2000; Vol. 21 (2): 161-163**

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It is generally accepted that diabetes, which antedates pregnancy, is a cause of increased perinatal mortality<sup>1-3</sup> while the role of gestational diabetes in perinatal mortality remains doubtful.<sup>4</sup> Although the multidisciplinary approach to the management of these diabetic pregnant patients remains the key to successful outcome; the obstetrician who has had some exposure to the management of diabetes might occasionally be faced with managing both the pregnancy as well as the diabetes. The aim of this retrospective study was to determine the fetal outcome in diabetic pregnancies over a 2 year period by way of perinatal mortality, and birth weight and to compare these with the non diabetic group in the same hospital population. The average total number of deliveries in the hospital was 3800 per year. A diabetic team consisting of 2 obstetricians exclusively managed these diabetic patients.

**Methods.** A case-controlled study design was carried out. It included all 83 diabetic patients (cases) who delivered during a 2-year period (January 1991-December 1992) at King Faisal Military Hospital, Khamis Mushayt in the Kingdom of Saudi Arabia. They all delivered babies that weighed more than 500 gms. None was excluded on account of poor control of blood sugars or compliance. These cases were obtained from the labor ward delivery register. The hospital record files were retrieved and the demographic data as well as the details of the pregnancy and the delivery were recorded. Data relating to the newborn as well as the birth weight, apgar score, neonatal morbidity was also extracted from the files. Information was also obtained from the case files on the infants of the diabetic mothers. The control group comprised of non-diabetic patients (83) who delivered in the same period. They were matched for age and parity.

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Received 13th June 1999. Accepted for publication in final form 1st November 1999.

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Diabetic patients were classified as established if the disease was diagnosed and was treated before pregnancy. These patients were either insulin dependent or non-insulin dependent diabetics. Gestational diabetes was diagnosed on the basis of oral glucose tolerance tests performed for the following indications: a random blood sugar of more than 7mMol/L, past history of unexplained stillbirth, previous macrosomia (>4.0kg), clinical or ultrasound evidence of macrosomia and or polyhydramnios in current pregnancy. A diagnosis of gestational diabetes was based on one or more of the following during a 75gm oral glucose tolerance test: a fasting plasma glucose >6mMol/L and a 2-hour plasma glucose >8mMol/L; according to the WHO (World Health Organization) criteria. All patients were admitted for a 24-hour plasma glucose profile. A dietitian started gestational diabetic patients on a diabetic diet, and those patients who did not respond to diet were started on insulin. An accepted satisfactory response is a fasting blood sugar <6mMol or less and a 2-hour post prandial of <9mMol or less. Established diabetics were started on insulin as soon as they were admitted and the treatment monitored by a 24-hour blood sugar profile. Insulin was given 30 minutes before each meal (short acting soluble insulin) while some patients required a medium acting insulin at bed time. (NPH).

Statistical analysis was carried out using the Statistical Package for Social Sciences (SPSS for MS Windows, Release 6.0). Independent sample t-test for equality of means was used for quantitative variables while chi square and Fisher's exact tests were used for qualitative data. The level of significance was set at 0.05. Odds Ratio with 95% confidence interval was calculated when necessary.

**Results.** Out of the total number of 83 diabetic patients that were recruited in this study as cases (Table 1), 26 patients were established diabetics (31%) while 57 patients had gestational diabetes (69%). Out of the gestational diabetic patients, 45 patients (80%) required insulin treatment and the rest, (20%) were on a diabetic diet. Of the established diabetics, 9 were insulin dependent while 16 patients were non-insulin dependent diabetics. They were all treated with insulin during pregnancy. Table 2 shows the demographic data of the diabetic patients and the control group. There were no significant differences in the age, parity and the gestation at delivery between the 2 groups,  $p > 0.05$ . The perinatal outcome in the cases and control group is shown in Table 3. The perinatal mortality rate in the diabetic group was 6.02% which was higher than that in the non diabetic control group which was 1.2%, however the difference was not significant statistically,  $p > 0.05$ , OR=5.26 (0.57-251.58). The mean birth weight and mode of delivery in the cases and controls is shown in Table 4. There was statistical difference in the

**Table 1** - Distribution of studied cases according to type of diabetes and treatment.

Treatment	Type of diabetes				Total	
	Established		Gestational		N	%
	N	%	N	%		
Insulin treatment	26	100	45	79	71	86
Diet control	0	0	12	21	12	14

**Table 2** - Maternal characteristics.

	Cases	Controls	P value
Age Mean years (SD)	33.53 (5.77)	33.78 (5.96)	> 0.05
Parity Mean (SD)	6.55 (2.96)	6.93 (3.69)	> 0.05
Gestation at delivery Mean weeks (SD)	39.43 (2.45)	38.53 (2.04)	> 0.05

**Table 3** - Perinatal outcome in cases and controls.

Outcome	Established diabetics	Gestational diabetics	Control
Alive	24	55	82
Fresh stillbirth	1	None	1
Macerated stillbirth	1	2	None
Early neonatal death	1	None	None
Perinatal deaths	3	2	1
Perinatal mortality rate	115 per 1000	35 per 1000	12 per 1000
Odd Ratio = 5.26 (0.57-251.58) NS NS - not significant statistically			

**Table 4** - Birth weight and mode of delivery in cases and controls.

Variable	Cases	Control	P value/OR
Birth weight (gms):-			
Mean (SD)	3381.1 (618.0)	3074.8 (510.4)	0.001*
Min - Max	660 - 4590	760 - 4100	
Mode of delivery:-			
Normal vaginal delivery	51 (61%)	73 (88%)	OR=0.22/ (0.09-0.51)*
Vacuum extraction	4 (5%)	3 (4%)	OR=1.35 (0.22-9.50)NS
Assisted breech delivery	3 (4%)	1 (1%)	OR=3.08 (0.24-163.3)NS
Cesarean section	24 (30%)	6 (7%)	OR=5.22 (1.90-16.48)*
NS - Not significant * - Significant			

**Table 5** - Mean height, weight and gestation at diagnosis of gestational diabetes.

Height (cm):	
Mean (SD)	155.5 (4.82)
Min - Max	145.0 - 164.0
Weight (gms):	
Mean (SD)	155.2 (16.90)
Min - Max	48.5 - 157
Gestation at diagnosis (weeks):	
Mean (SD)	28.49 (6.11)

mean birth weight and cesarean section rate in the 2 groups ( $p=0.001$  and  $OR=5.22$  (1.90-16.48)). The mean height, weight and gestation at diagnosis of the gestational diabetic patients is shown in Table 5.

**Discussion.** The influence of diabetes mellitus on perinatal mortality and morbidity is borne out in this study. The perinatal mortality for the control group in the same hospital population was 12 per 1000 while in this case, the perinatal mortality was 60.24 per 1000. This figure is 5 times greater than that recorded for babies born to non diabetic mothers in the same hospital; in keeping with other studies.<sup>1,3,6</sup> However, this was not significant statistically. We did not intend to ignore the vital role of the diabetologist in the management of the pregnant diabetic patient; situations beyond the control of the obstetrician might arise occasionally whereby he had to manage the diabetes by himself. Previous experience is of course mandatory. In our study, all the perinatal deaths in the established diabetics occurred in the non insulin dependent group i.e those on oral hypoglycemics or diet before pregnancy. It is difficult to make deductions from this observation because of the small number, but these patients tend to be obese with associated problems like hypertension. Several authors<sup>7-11</sup> have demonstrated the impact of glycemic control on perinatal outcome. However, in our series, 3 out of the 4 stillbirths occurred in patients with apparently good control of blood sugars levels throughout pregnancy. Our study included both controlled and uncontrolled diabetics. However, the fact that the control of blood sugar levels were based only on tests carried out 2 days before the antenatal clinic visit could make it difficult to evaluate the glycemic control long-term. Glycosylated hemoglobin or fructosamine estimations would have been invaluable.

There are other factors, in the modern management of diabetic pregnancy that may result in low perinatal mortality rates. Availability of elective abortions for unwanted abnormal fetuses, application of fetal monitoring tests, and a tendency to perform delivery around term are examples of measures that may

reduce perinatal deaths independent of glycemic control. Perinatal deaths seen more in established diabetics than in the gestational category was also observed by Chirenje.<sup>1</sup> It was noted that about 79% of the patients with gestational diabetes required insulin treatment while other studies<sup>10,12</sup> independently reported 86% and 34%. It is possible that both genetic and environmental factors may be responsible for these observed differences. The cesarean section rate in our study population (30%) which is 4 times that of the control group in the hospital population (7%) which would suggest an increase in the cost of child birth for the diabetic patient. This together with the cost of medication and hospital admission goes to show the financial resources involved in the management of the diabetic pregnant patient. As this condition may be prevented, we recommend that more emphasis be placed on health education.

**Acknowledgment.** I will like to thank Dr Ali Sadek for his help in reviewing and applying the necessary statistical analysis.

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