

Background

Women with pregestational diabetes experience higher rates of adverse pregnancy outcomes compared to the background population. It is established that the risk of certain outcomes including malformations and perinatal mortality is related to poor glycemic control in early pregnancy.

Intervention before pregnancy is necessary to ensure optimal glycemic control throughout the time of conception and the critical early stage of pregnancy.

Prepregnancy care (PPC) for women with type 1 diabetes has been demonstrated to reduce adverse outcomes. However, many studies are small, predate the era of modern diabetes care in pregnancy and do not include women with type 2 diabetes.

Aims and Methods

Aims:

1. Establish a PPC program for women with pregestational diabetes
2. to evaluate the effectiveness of this program over a period of 7 years.

Methods:

This was a prospective cohort study and included women with type 1 and type 2 diabetes attending 5 antenatal centres in the West of Ireland between January 2006 and December 2013.

Women living in the region with type 1 or 2 diabetes were contacted in writing on a yearly basis using a diabetes register. They received an information leaflet outlining the importance of PPC and advice on how to engage with the program. Referrals were also accepted from specialist providers and primary care. Prepregnancy care was delivered in specialist clinics without additional funding using a standardized proforma.

Primary outcomes included adverse neonatal outcome (shoulder dystocia, congenital malformation, stillbirth or neonatal death), delivery by cesarean section, admission to the neonatal intensive care unit, use of prepregnancy folic acid, and first trimester HbA1c. Comparisons were made between those that did and did not attend the PPC program.

Results

452 women were included: 275 (60.8%) type 1 & 177 (39.2%) type 2 diabetes.

PPC was attended by 148 (32.7%) women, 109 (39.6%) of those with type 1 and 39 (22.0%) of those with type 2 diabetes.

Table 1 outlines the baseline characteristics of the participants:

	Attended PPC (n=148)	Did not attend PPC (n=304)	Sig.
Age (yrs)	33.75 +/- 4.58	31.79 +/- 5.8	<0.001
Parity	0.75 +/- 0.85	1.10 +/- 1.32	0.001
Smoker	13 (8.8%)	44 (14.5%)	0.10
Type 1 diabetes	109 (73.6%)	166 (54.6%)	<0.001
Type 2 diabetes	39 (26.4%)	138 (45.4%)	<0.001
Diabetes duration (yrs)	11.6 +/- 9.6	9.2 +/- 8.6	0.01
Caucasian	140 (94.6%)	251 (82%)	<0.001

Results

Table 2 compares outcomes for those who did and did not attend PPC:

	Attended PPC (n=148)	Did not attend PPC (n=304)	Sig.
Prepregnancy folate	143 (96.6%)	167 (54.9%)	<0.001
Livebirths	123 (83.1%)	262 (86.8%)	0.39
Miscarriages	23 (15.5%)	32 (10.5%)	
Stillbirths	1 (0.67%)	9 (2.9%)	
Neonatal death	1 (0.67%)	1 (0.3%)	
Prematurity (<35 wks)	30 (20.3%)	58 (19%)	0.76
Birthweight (kg)	3.61 +/- 0.81	3.46 +/- 0.78	0.86
Size to age (livebirths only)			
AGA	81 (65.8%)	176 (67.1%)	0.80
SGA	4 (3.3%)	22 (7.2%)	
LGA	35 (28.5%)	64 (24.4%)	
Composite adverse outcome	6 (4.1%)	29 (9.5%)	0.04
NICU admission	55 (37.2%)	148 (48.7%)	0.02
Duration in NICU (days)	7.85 +/- 11.37	7.88 +/- 12.1	0.79
Neonatal hypoglycemia	16 (10.8%)	45 (14.8%)	0.24
Breastfeeding	53 (35.8%)	111 (36.5%)	0.92
Hypertensive disorder	26 (17.6%)	72 (23.7%)	0.15
Booking BMI (kg/m ²)	27.8 +/- 5.67	29.1 +/- 6.5	0.06
Cesarean Delivery	85 (57.4%)	165 (54.2%)	0.53
1 st Trimester HbA1c (%)	6.9 +/- 1.1	7.8 +/- 1.8	0.003
2 nd Trimester HbA1c (%)	6.2 +/- 0.8	6.6 +/- 1.1	0.001
3 rd Trimester HbA1c (%)	6.1 +/- 0.7	6.4 +/- 1.0	0.005

Table 3 displays independent predictors of composite adverse neonatal outcome:

Attendance at PPC significantly reduces the odds of this outcome.

	Sig.	Odds Ratio	95% C.I.	
			Lower	Upper
Age	0.40	0.97	0.90	1.04
Smoking	0.73	1.21	0.41	3.56
Attendance at PPC	0.02	0.27	0.10	0.83
Type 1 diabetes	0.57	1.46	0.40	5.37
Non-Caucasian Ethnicity	0.65	1.41	0.32	6.17
Duration of diabetes in years	0.51	1.02	0.96	1.08
BMI at booking	0.76	1.01	0.95	1.08

Conclusions

Women who attend PPC are more prepared for pregnancy as demonstrated by higher rates of preconceptual folic acid use and lower 1st trimester HbA1c.

There was a lower rate of major adverse neonatal outcomes and less admissions to the neonatal care unit among infants born to women who attended PPC.

This study supports the ongoing provision of PPC to all women planning pregnancy with pregestational diabetes, type 1 and type 2.