



10 YEARS OF IMPROVING OUTCOMES FOR WOMEN WITH TYPE 1 AND TYPE 2 DIABETES DURING PREGNANCY

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BACKGROUND

Atlantic Diabetes in Pregnancy (DIP) programme

Established in 2005, It comprises a network of hospitals on the Irish Atlantic seaboard, which have obstetric services treating a population of 500,000 with 11000 deliveries annually.

Aims to provide evidence based care for women with Diabetes Mellitus before, during and after pregnancy

It has a dual role, providing clinical care as well as undertaking observational cohort/case-control studies aiming to enhance knowledge and improve management for women with Diabetes

The group has published 2 previous audits of pregnancy outcomes and improved clinical care delivery based on results of these audits. This is a third re-audit of outcomes

The ultimate aim is pregnancy outcome similar to that of women without diabetes

3. *Dedicated combined antenatal/diabetes clinics*

4. *Specialist delivered care*

5. *Electronic recording*



RESULTS

DEMOGRAPHICS

| | Period 1 2005-07 (n=104)/% | Period 2 2008-10 (n=168)/% | Period 3 2011-14 (n=173)/% |
|---------------------|----------------------------------|----------------------------------|----------------------------------|
| Type 1 Diabetes | 80 (76.9) | 87 (51.8) | 106 (61.3) |
| Type 2 Diabetes | 24 (23.1) | 81 (48.2) | 67 (38.7) |
| Age | 31.9 (5.6) | 32.3 (5.8) | 32.8 (4.9) |
| Caucasian ethnicity | 94 (90.4) | 140 (83.3) | 158 (91.3) |
| Parity | 0.9 (1.2) | 1.1 (1.2) | 1.0 (1.3) |

PREGNANCY PREPARATION

| | Period 1 2005-07 n/% | Period 2 2008-10 n/% | Period 3 2011-14 n/% | All groups P value | Period 1 vs Period 2 P value | Period 1 vs Period 3 P value | Period 2 vs Period 3 P value |
|--------------------|----------------------------|----------------------------|----------------------------|-----------------------|---------------------------------|---------------------------------|---------------------------------|
| Folic Acid | 47 (45.2) | 87 (51.8) | 125 (72) | 0.001 | 0.56 | 0.02 | <0.001 |
| Pre-pregnancy Care | 29 (27.9) | 45 (26.8) | 89 (51.5) | <0.001 | 0.58 | 0.001 | <0.001 |
| Actively smoking | 15 (14.4) | 17 (10.1) | 21 (12.1) | 0.17 | 0.16 | 0.07 | 0.81 |

BODY MASS INDEX/GESTATIONAL WEIGHT GAIN

| | Period 1 2005-07 n=104/% | Period 2 2008-10 n=168/% | Period 3 2011-14 n=173/% | All groups P value | Period 1 vs Period 2 P value | Period 1 vs Period 3 P value | Period 2 vs Period 3 P value |
|---|--------------------------------|--------------------------------|--------------------------------|-----------------------|---------------------------------|---------------------------------|---------------------------------|
| BMI | 28.1 (5.2) | 30.3 (6.6) | 29.6 (6.5) | 0.08 | 0.02 | 0.11 | 0.34 |
| Booking BMI >30kg/m ² | 19 (18.2) | 69 (41.1) | 72 (41.6) | 0.13 | 0.004 | | 0.65 |
| Excessive weight gain | 20 (19.2) | 44 (26.2) | 75 (43.4) | <0.001 | 0.5 | <0.001 | <0.001 |
| Normal BMI 18.5 – 24.9kg/m ² | 4 (17.4) | 17 (43.6) | 17 (53) | 0.03 | 0.04 | 0.01 | 0.42 |
| Overweight 25.0 – 29.9kg/m ² | 8 (28.6) | 7 (16.3) | 29 (64.4) | <0.001 | 0.22 | 0.003 | <0.001 |
| Obese ≥30kg/m ² | 3 (17.6) | 17 (25.7) | 27 (41) | 0.07 | 0.48 | 0.08 | 0.06 |

GLYCAEMIC CONTROL

| Mean HbA1c +/- SD | Period 1 2005-07 % | Period 2 2008-10 % | Period 3 2011-14 % | All groups P value | Period 1 vs Period 2 P value | Period 1 vs Period 3 P value | Period 2 vs Period 3 P value |
|---------------------------|--------------------------|--------------------------|--------------------------|-----------------------|---------------------------------|---------------------------------|---------------------------------|
| 1 st Trimester | 7.9 (1.7) | 7.5 (1.6) | 7.0 (1.5) | 0.001 | 0.15 | <0.001 | 0.03 |
| 2 nd Trimester | 6.7 (1.2) | 6.5 (1.1) | 6.3 (0.8) | 0.01 | 0.12 | 0.002 | 0.14 |
| 3 rd Trimester | 6.4 (1.2) | 6.2 (0.8) | 6.3 (0.8) | 0.31 | 0.15 | 0.25 | 0.67 |
| 1 st Tri ≤6.5% | 15 (14.4) | 32 (19.0) | 63 (36.4) | <0.001 | 0.41 | 0.02 | <0.001 |

MATERNAL OUTCOMES

| | Period 1 2005-07 n/% | Period 2 2008-10 n/% | Period 3 2011-14 n/% | All groups P value | Period 1 vs Period 2 P value | Period 1 vs Period 3 P value | Period 2 vs Period 3 P value |
|-----------------------------------|----------------------------|----------------------------|----------------------------|-----------------------|---------------------------------|---------------------------------|---------------------------------|
| Caesarean delivery | 43 (41.3) | 103 (61) | 96 (55.5) | 0.002 | 0.002 | 0.001 | 0.7 |
| Elective caesarean | 18 (17.3) | 61 (36.3) | 56 (32.4) | 0.13 | 0.07 | 0.07 | 0.9 |
| Emergency caesarean | 25 (24.0) | 42 (25.0) | 40 (23.1) | | | | |
| Pregnancy associated hypertension | 12 (11.5) | 44 (26.2) | 34 (19.7) | 0.004 | 0.001 | 0.1 | 0.05 |
| Pre-eclampsia | 7 (6.7) | 22 (13) | 20 (11.6) | 0.12 | 0.06 | 0.22 | 0.42 |
| Maternal Composite | 31 (29.8) | 70 (41.7) | 65 (37.6) | 0.12 | 0.04 | 0.19 | 0.43 |

BIRTH OUTCOMES

| | Period 1 2005-07 n/% | Period 2 2008-10 n/% | Period 3 2011-14 n/% | All groups P value | Period 1 vs Period 2 P value | Period 1 vs Period 3 P value | Period 2 vs Period 3 P value |
|-------------------------|----------------------------|----------------------------|----------------------------|-----------------------|---------------------------------|---------------------------------|---------------------------------|
| Live birth | 77 (74.0) | 154 (91.7) | 148 (85.5) | 0.001 | <0.001 | 0.007 | 0.04 |
| Miscarriage | 23 (22.1) | 12 (7.1) | 25 (14.5) | | | | |
| Stillbirth | 4 (3.8) | 2 (1.2) | 0 (0) | | | | |
| Malformations | 4 (3.8) | 9 (5.4) | 2 (1.2) | 0.07 | 0.58 | 0.12 | 0.02 |
| Macrosomia >4.0kg | 23 (22.1) | 35 (20.8) | 39 (22.5) | 0.63 | 0.37 | 0.76 | 0.50 |
| >4.5kg | 5 (4.8) | 9 (5.4) | 13 (7.5) | 0.58 | 0.94 | 0.61 | 0.38 |
| Neonatal intensive care | 47 (45.2) | 86 (51.2) | 72 (41.6) | 0.15 | 0.57 | 0.09 | 0.15 |



CONCLUSIONS

- Improved pregnancy preparation and attendance at pre-pregnancy care
- Improved birth outcomes- less malformations, miscarriages, still births
- Better glycemic control
- Higher BMI and gestational weight gain
- Increase in elective caesarean section deliveries
- No decrease in macrosomia

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- Dunne FP, Avalos G, Dunne M, Mitchell Y, Gallacher T, Keenan M, Hogan M, Carmody LA, Gaffney G ATLANTIC DIP: pregnancy outcome for women with pregestational diabetes along the Irish Atlantic seaboard. *Diabetes Care*. 2009 Jul;32(7)

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ATLANTIC DIP: Pregnancy Outcome for Women With Pregestational Diabetes Along the Irish Atlantic Seaboard

Fidelma P. Dunne, PhD, Gloria Avalos, MSc, Mavee Durkan, MD, Yvonne Mitchell, Theresa Gallacher, RN, Maria Koonan, RN/DM, Marie Hogan, Louise A. Carmody, Geraldine Gaffney, MD and for the ATLANTIC DIP collaborators

ATLANTIC DIP: Closing the Loop A change in clinical practice can improve outcomes for women with pregestational diabetes

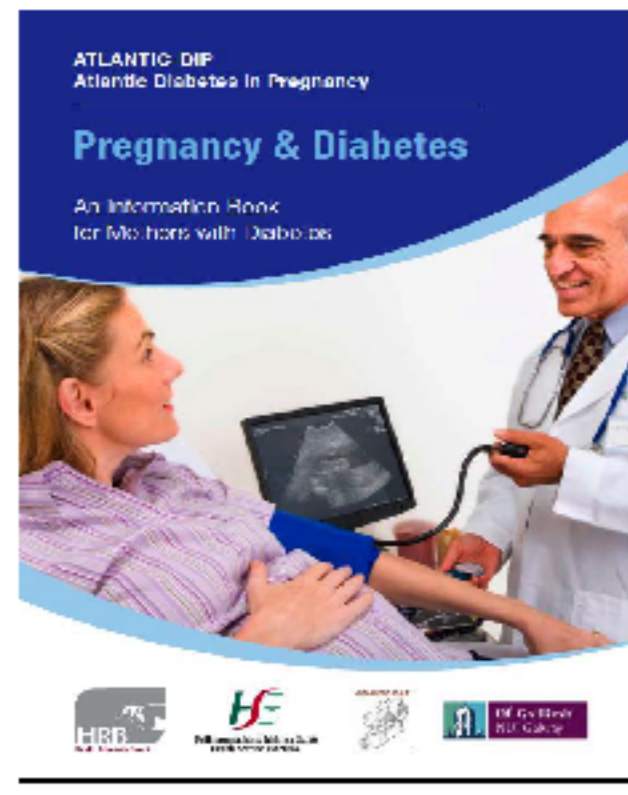
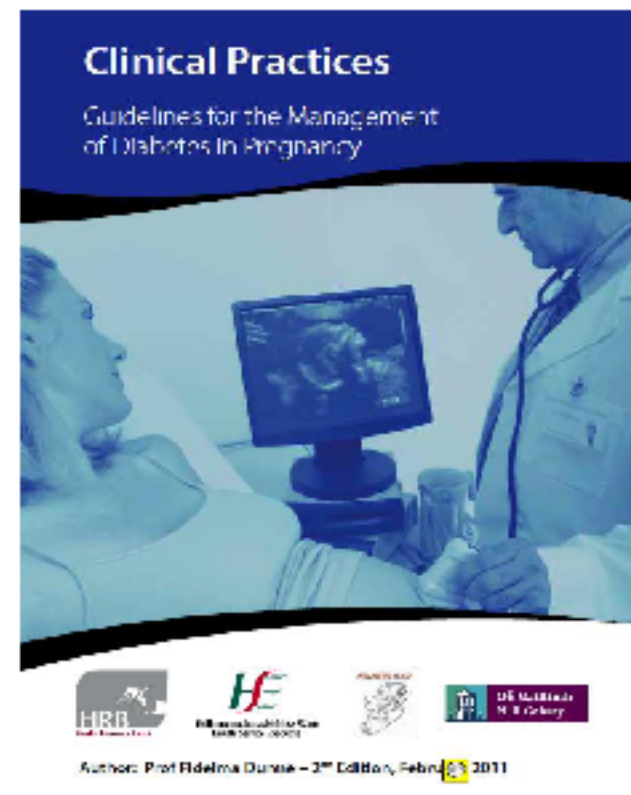
Lisa A. Owens, MB, BCH, BAO, MRCP, Gloria Avalos, MSc, Brebla Kirwan, RN, Louise Carmody, BA and Fidelma Dunne, MB, BCH, BAO, PhD

- "The stillbirth rate was 5 times, perinatal mortality rate 3.5 times, congenital malformation rate double that of the background population"
- 28% pre-pregnancy care
- 43% pre-pregnancy folic acid
- 51% A1C ≤7% first antenatal visit
- Less miscarriage rates
- Less stillbirth
- 52% pre-pregnancy care
- 61% pre-pregnancy folic acid
- 63% A1C ≤7% first antenatal visit

MATERIALS & METHODS

Process of optimisation of clinical care

1. *Local Guidelines & patient education booklets*



2. *Pre-pregnancy care programme (PPC)*

Aims of PPC

1. Contraceptive advice
2. Glycaemic targets
3. Folic acid use
4. Hypoglycaemia avoidance
5. Stop teratogenic drugs
6. Blood pressure optimisation
7. Complications- screening/treatment
8. Weight management

