



Review article

A review of interventions to prevent Type 2 Diabetes after Gestational Diabetes



Ann S. Peacock^{a,c,*}, Fiona Bogossian^a, H. David McIntyre^{b,c}, Shelley Wilkinson^{c,d}

^a School of Nursing and Midwifery, Faculty of Health Sciences, The University of Queensland, Herston Campus, Edith Cavell Building, Herston, QLD 4006, Australia

^b Mater Clinical School, The University of Queensland, Australia

^c Mothers and Babies Theme, Mater Research, Mater Health Services, Raymond Terrace, South Brisbane, Brisbane, QLD 4101, Australia

^d Department of Nutrition & Dietetics, Mater Health Services, Raymond Terrace, South Brisbane, Brisbane, QLD 4101, Australia

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ABSTRACT

Background: Gestational Diabetes Mellitus (GDM) during pregnancy is a risk factor for the development of Type 2 Diabetes (T2DM) within 15 years, and prevention programmes have been problematic.

Question: The aim of the study is to identify effective strategies and programmes to decrease the risk of T2DM in women who experience GDM, the barriers to participation, and the opportunities for midwives to assist women in prevention.

Methods: English language, peer reviewed and professional literature published between 1998 and 2013 were searched. A systematic review of the literature was undertaken, included studies were then appraised for quality and finally findings of the studies were thematically analysed.

Findings: This review identified that there are interventions that are effective, however most lifestyle changes are difficult to translate into everyday life. As the incidence of GDM is expected to rise, midwives' role in promoting long-term health behaviours requires further review.

Conclusions: Women need to overcome barriers and be supported in making the behavioural changes necessary to prevent T2DM following GDM. Midwives as the primary carers for women in pregnancy and childbirth are ideally positioned to educate women and engage them in lifestyle and behaviour programmes that prevent the onset of Type 2 Diabetes.

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1. Introduction

Worldwide, the incidence of Gestational Diabetes Mellitus (GDM) has been increasing over the last 15 years along with increasing obesity rates.¹ The incidence of GDM in Australia was 5% in 2008,² however under new diagnostic criteria the rate could be as high as 13%.³ With escalating rates of diagnosis midwives will play an increasingly important role in the care of women with GDM, collaborating with the specialist care team of endocrinologists, obstetricians, diabetes educators and dietitians.

Gestational Diabetes Mellitus is carbohydrate intolerance recognised or first diagnosed during pregnancy.⁴ The original identification of GDM by O'Sullivan in the 1960s using the Oral Glucose Tolerance Test (OGTT) was the first step in recognising the importance of this condition in pregnancy.⁵ Since then the Hyperglycaemia and Adverse Pregnancy Outcome (HAPO) study has reinforced the associations between elevated maternal blood glucose control and adverse neonatal outcomes including increased birth weight, foetal adiposity and umbilical cord blood C-peptide levels.⁶ The results of this landmark study have led to a greater understanding of glucose metabolism during pregnancy and the revision of diagnostic criteria for blood glucose levels for GDM.

It is important for midwives to understand the relationship between GDM and Type 2 Diabetes Mellitus (T2DM), the impact on the index pregnancy, and the effect on future health of mothers and their infants in order to provide women with

* Corresponding author at: School of Nursing and Midwifery, Faculty of Health Sciences, The University of Queensland, Herston Campus, Edith Cavell Building, Herston, QLD 4006, Australia. Tel.: +61 0731632874.

E-mail address: a.peacock2@uq.edu.au (A.S. Peacock).

relevant evidence-based care and advice for the long-term wellbeing of themselves and their families. The relationship between the diagnosis of GDM and the onset of T2DM has been the focus of numerous reports, studies and reviews over the last decade, and GDM has emerged as one of the strongest predictors of T2DM with the cumulative incidence of T2DM ranging from 2.6% to 70% from 6 weeks to 28 years post-partum.^{7–11}

Documented risk factors for GDM are similar to those for T2DM, and include older maternal age (>35), obesity (BMI > 30 kg/m²), family history of Type 1 or Type 2 diabetes, and a diet high in saturated fat.¹² Common risk factors in the development of GDM and T2DM underlie the temporal relationship between these two conditions, leading to a high risk of development of T2DM following the GDM pregnancy.⁷

The identification of women who face the consequent risk of developing T2DM during their pregnancy provides midwives with an opportunity to individually, and with other members of the multi-disciplinary team, initiate education and support women in interventions to decrease modifiable risk factors such as high BMI, excess gestational weight gain, and insufficient physical activity.¹³ The opportunity to intervene is not restricted to the antenatal period but extends into the postnatal period and to the pre-conception phase of a subsequent pregnancy. The Australasian Diabetes in Pregnancy Society (ADIPS) guidelines recommend follow up care in collaboration with General Practitioners, and include an OGTT at 6 to 12 weeks postpartum, with diagnosis of T2DM according to WHO criteria and then 1 to 2 yearly depending on risk factors.¹⁴ Women planning to conceive again should have an annual OGTT to exclude T2DM prior to conception.⁴ While the OGTT is an essential diagnostic and screening tool compliance with guidelines has been sporadic at best.^{15,16}

Obesity is an independent risk factor for the development of T2DM, so the identification of women with both GDM and obesity is important to allow tailored and targeted delivery of information and programmes to support this population.¹⁷ Despite this recognition, lifestyle changes in new mothers to prevent or delay the onset of T2DM have been difficult to deliver or to engage women.¹⁸ In addition to the long-term increased risk of T2DM, the infant/child of a GDM pregnancy has a two-fold increase of being overweight.¹⁹ Animal models have also shown increased obesity and altered glucose metabolism in offspring of mothers who had GDM,²⁰ and developing and promoting interventions to the population of mothers with young children both in the antenatal and immediate postpartum period may lead to a “whole of family” approach and to the prevention of a suite of chronic diseases.²⁰ Midwifery intervention, referral and/or collaboration with appropriate multi-disciplinary team members during pregnancy may have a profound effect not only on the current pregnancy outcomes, but also on the future health of the mother, her infant and family.

Although women may be aware of the risks of future development of T2DM, they may not always act on this knowledge and initiate lifestyle changes suggested by health practitioners.²¹ Tiredness, lack of access to childcare and work commitments are commonly cited by women as deterrents of their engagement in intervention programmes to delay or prevent T2DM after GDM.²² There are, however, strategies that midwives can initiate in the immediate post-partum that can lead to long-term health changes such as the encouragement and support of breastfeeding.

Breastfeeding is beneficial in the prevention of T2DM in obese women and in those women diagnosed with GDM.^{23,24} The benefits of breast-feeding depend on the length and intensity of lactation, as longer duration of lactation (up to 9 months) improves glucose metabolism and insulin sensitivity and reduces T2DM risk after GDM diagnosis.²³ Difficulties surrounding the establishment of breast feeding and lactation in both obese and GDM women have been documented.²³

Midwives are ideally positioned to implement strategies including promotion of early breastfeeding, maintaining supply and long term post-partum breastfeeding support^{25,26} that may lower a woman's risk of T2DM and may be beneficial for long term health.²⁴ Continuity of care by a midwifery team has also shown to enhance screening of at risk women identified while pregnant, as well as providing opportunistic education relating to long term lifestyle changes that may delay or prevent T2DM.²⁷

Poorly managed GDM not only results in negative maternal and infant outcomes but also has future fiscal implications if it leads to T2DM. The health care cost of T2DM to society has been examined in the United States where the national economic burden in 2007 attributed to diabetes was approximately \$US218 billion.²⁸ An Australian study, using a micro-simulation model, demonstrated that the most cost-effective intervention option to decrease T2DM risk is a combined diet and exercise programme aimed at high risk populations with the focus on prevention of T2DM development.²⁹ This recommendation has been strengthened by cost benefit studies which suggest that interventions in this group to delay or prevent the development of T2DM are cost effective.^{30,31} In summary, the literature indicates that the prevalence of the GDM is increasing and the link between GDM and T2DM has been clearly demonstrated, and makes ethical and economic sense to pursue interventions that may decrease the risk of T2DM in women with GDM.

In order to do so we posed three research questions: How effective are interventions to delay or prevent T2M in women previously diagnosed with GDM?, what are the barriers and enablers to and predictors of women, previously diagnosed with GDM, engaging in interventions designed to delay or prevent T2DM?, and what is the role of the midwife to delay or prevent T2DM following a diagnosis of GDM?

2. Methods

The aim of this review is to identify effective strategies and programmes to decrease the risk of T2DM in women who experience GDM, the barriers to participation, and the opportunities for midwives to assist women in prevention.

A three-stage approach was employed in order to answer the research questions. Firstly a systematic review of the literature was undertaken, induced studies were then appraised for quality and finally findings of the studies were thematically analysed.

Between February 2011 and November 2013 we searched CINAHL, Medline and PubMed databases. Key search terms were used, including gestational diabetes, gestational diabetes mellitus, diabetes mellitus, type 2 diabetes, epidemiology, prevalence, incidence, risk factors, barrier*, intervention*, strategy*, prevent*, program*, diet, exercise, midwives, nurse* and breastfeeding. A secondary hand search of the reference lists of retrieved articles yielded further papers for evaluation. Publications dates were limited to the previous 15 years, because this period represents the largest concentration of contemporary research.

Inclusion criteria were: women previously diagnosed with GDM (population), behavioural and pharmacological interventions intended to reduce maternal risk of T2DM (interventions), delay or prevention of development of T2DM (outcomes), English (language), peer reviewed publications or professional publications (source), and 1998 to 2013 (publication time period).

The preliminary search, based on title and abstract, yielded 122 articles. The first author (AP) then reviewed these articles and discarded commentaries, reviews and research that focused on populations other than women who had been diagnosed with GDM. Full text articles were then assessed for eligibility, and included reviews were then assessed by FB (second author). Following this, 30 articles remained (Fig. 1). The reporting quality

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