

**An investigation into the dietary management of gestational
diabetes in Australian women and postnatal health and lifestyle
behaviours for future diabetes risk reduction**

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Statement of originality

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text. I give consent to this copy of my thesis, when deposited in the University Library, being made available for loan and photocopying subject to the provisions of the Copyright Act 1968.

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Acknowledgement of collaboration

I hereby certify that the work embodied in this thesis has been done in collaboration with other researchers. I have included as part of my thesis a statement clearly outlining the extent of the collaboration, with whom and under what auspices.

Melinda Morrison

Acknowledgement of authorship

I hereby certify that this thesis is in the form of a series of published papers of which I am a joint author. I have included as part of my thesis a written statement from each co-author, endorsed by the Faculty Assistant Dean (Research Training), attesting to my contribution to the joint publications.

Melinda Morrison

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List of abbreviations

AAQ	Active Australia Questionnaire
ADA	American Dietetic Association
AIHW	Australian Institute of Health and Welfare
ACHOIS	Australian Carbohydrate Intolerance Study
ADIPS	Australasian Diabetes in Pregnancy Society
AHEI	Alternate Healthy Eating Index
AMED	Alternative Mediterranean Diet (score)
ARFS	Australian Recommended Food Score
BG	Blood glucose
BGL	Blood glucose level
BMI	Body mass index
CALD	Culturally and linguistically diverse
CI	Confidence interval
DAA	Dietitians Association of Australia
DASH	Dietary Approaches to Stop Hypertension
DPP	Diabetes Prevention Program
DPS	Diabetes Prevention Study
DQES	Dietary Questionnaire for Epidemiological Studies
FBG	Fasting blood glucose

FFQ	Food frequency questionnaire
FSANZ	Food Standards Australia & New Zealand
GDM	Gestational diabetes mellitus
GI	Glycemic index
HAPO	Hyperglycemia and Adverse Pregnancy Outcomes (study)
Hb _{A1c}	Glycosylated haemoglobin
HEI	Healthy Eating Index
HR	Hazard ratio
IADPSG	International Association of Diabetes and Pregnancy Study Groups
IOM	Institute of Medicine
LGA	Large for gestational age
LR	Logistic regression
MiG	Metformin in Gestational Diabetes (study)
MNT	Medical nutrition therapy
NDSS	National Diabetes Services Scheme
NHMRC	National Health & Medical Research Council
NRV	Nutrient Reference Values
NSW	New South Wales
OGTT	Oral glucose tolerance test
OR	Odds ratio
RDI	Recommended dietary intake

RR	Relative risk
SD	Standard deviation
SEIFA	Socioeconomic Index for Areas
US	United States
WHO	World Health Organisation

Abstract

Gestational diabetes mellitus (GDM) is a form of diabetes with onset or first recognition during pregnancy. GDM has been associated with an increased risk of adverse pregnancy outcomes and longer term health consequences for both mother and offspring, including an increased risk of type 2 diabetes. With evidence suggesting rates of GDM are increasing in Australia, there is a need to optimise dietary interventions and strategies for future diabetes risk reduction, in order to ensure the best possible pregnancy outcomes and address the growing public health problem of type 2 diabetes. The primary purpose of this thesis is to investigate current Australian dietetic practice in the management of GDM; describe the postnatal health and lifestyle patterns of women with recent GDM and identify factors that influence preventive health behaviours for future type 2 diabetes risk reduction. Three research studies were undertaken to meet the aims of this body of research.

A survey of Australian dietitians (n=220) currently working in GDM management was undertaken to examine Australian dietetic practice in the management of GDM, identify current models of dietetic care and determine the need for national evidence based GDM guidelines. The study showed consistency in key components of nutrition education; however there were a number of differences in the implementation of medical nutrition therapy by Australian dietitians in regards to nutrient recommendations. Overall, the survey results strongly indicate a need for evidence-based gestational diabetes practice guidelines and nutritional recommendations and provided baseline data for future practice of Australian dietitians working in GDM.

Postnatal health and lifestyle behaviours in women with GDM were investigated in a cross sectional survey of women with diagnosed with GDM in the previous three years and registered with the National Diabetes Services Scheme (NDSS) (n=1372). This study highlighted low rates (27.4%) of return for follow-up diabetes screening compared to current recommendations, and found that receiving specialised diabetes care, risk reduction advice and postnatal reminders were associated with an increased

likelihood of returning for follow-up. Women with recent GDM also failed to achieve diet patterns in line with current national dietary recommendations, as evidenced by overall poor diet quality measured using the Australian Recommended Food Score (mean \pm SD ARFS 30.9 \pm 8.1). Although women with known risk factors for type 2 diabetes were more likely to perceive that they were high risk for diabetes up to three years after a GDM pregnancy, one third still considered themselves to be at low or very low risk for the development of diabetes. In qualitative analysis of women's experiences of living with GDM in this study, the importance of health professional support was highlighted and some of the challenges and opportunities for future diabetes risk reduction identified.

Breastfeeding was examined as part of a mixed methods study within this body of work. In the quantitative component of this research a cross-sectional online survey was undertaken with women (n=729) diagnosed with GDM in 2010 and registered with the NDSS. Early breastfeeding cessation was found to be associated with breastfeeding problems at home, return to work prior to three months, not being married or in a de facto relationship, inadequate breastfeeding support, caesarean delivery, living in a lower socioeconomic area and having a higher BMI. This study identified those at highest risk of early breastfeeding cessation and suggests that additional breastfeeding support specifically targeting women with GDM is needed.

In conclusion, the study findings presented in this thesis highlight the need for an evidence based approach to dietetic interventions provided to women with GDM and improved access to postnatal care. The findings also demonstrated that the current postnatal health and lifestyle behaviours of Australian women with GDM are not conducive to chronic disease prevention. This research demonstrates the need for strategies to promote and support preventive health behaviours in Australian women with GDM in order to reduce risk factors for type 2 diabetes and optimise maternal health and well-being.