Introduction

- During gestational diabetes mellitus (GDM), small degrees of hyperglycaemia have significant effects on pregnancy and neonatal outcomes (1).
- Exercise may be an effective strategy to optimize glucose homeostasis as it lowers blood glucose levels via 2 distinct pathways: contraction-mediated & insulin stimulated pathways (2).
- Despite multiple interventions over the last decade, the most effective form of lifestyle management composed of dietary and physical activity behaviours for the prevention of GDM remains undetermined (3).
- To maximise the use of exercise for clinical management, the most effective modality should be identified.

The purpose of this review is to elucidate the most effective modality of exercise on insulin sensitivity and blood glucose control in pregnant women with or at risk of GDM.

Methods

Types of studies
Prospective randomized control trials (RCT) & case-controlled studies

Types of participants
The target population were pregnant women at risk or diagnosed with GDM

Types of interventions
Exercise intervention only (no nutrition intervention), performed during pregnancy, which examined the insulin and glycaemic effects of exercise intervention

Search strategy
‘gestational diabetes’ AND ‘exercise’ AND ‘intervention’ AND ‘glycaemic control’ NOT ‘type II diabetes’

Search databases
MEDLINE (Ebsco), PUBMED (NCBI), Scopus, CINAHL, Cochrane library, EMBASE and Maternity & Infant Healthcare Database (Ovid).

Assessment of risk of bias
Cochrane assessment of risk of bias tool was used.

Data synthesis & analysis
Eligible studies did not have combinable outcomes for meta-analysis, a narrative review was thus undertaken. The eligible articles were summarized and discussed.

Results

Table 1 (below) – Characteristics of studies meeting eligibility criteria

<table>
<thead>
<tr>
<th>Article</th>
<th>Intervention</th>
<th>Control</th>
<th>Mode (RT, AER)</th>
<th>Diagnosed with GDM</th>
<th>All at risk of GDM</th>
<th>Start point</th>
<th>End point</th>
<th>Duration (weeks)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brankston et al., 2004</td>
<td>16</td>
<td>16</td>
<td>RT</td>
<td>X</td>
<td>From GDM diagnosis (24-32)</td>
<td>Till end of gestation</td>
<td>≤5</td>
<td></td>
</tr>
<tr>
<td>Ab Barros et al., 2010</td>
<td>32</td>
<td>32</td>
<td>RT</td>
<td>X</td>
<td>From GDM diagnosis (24-34 weeks)</td>
<td>Till end of gestation</td>
<td>≤5</td>
<td></td>
</tr>
<tr>
<td>Hulse et al., 2014</td>
<td>20</td>
<td>20</td>
<td>AER</td>
<td>X</td>
<td>From GDM week 28 to 30th week of gestation</td>
<td>Till week 34</td>
<td>≤5</td>
<td></td>
</tr>
<tr>
<td>Ruchat et al., 2011</td>
<td>6</td>
<td>6</td>
<td>AER</td>
<td>X</td>
<td>Between 16-20 weeks</td>
<td>16-20 weeks</td>
<td>16-20</td>
<td></td>
</tr>
<tr>
<td>Davenport et al., 2008</td>
<td>10</td>
<td>10</td>
<td>AER</td>
<td>X</td>
<td>From diagnosis (24-28 weeks)</td>
<td>To delivery</td>
<td>16 weeks</td>
<td></td>
</tr>
<tr>
<td>Ong et al., 2009</td>
<td>6</td>
<td>6</td>
<td>AER</td>
<td>X</td>
<td>From week 10 gestation</td>
<td>28 weeks gestation</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Callaway et al., 2010</td>
<td>25</td>
<td>25</td>
<td>AER</td>
<td>X</td>
<td>From 13 weeks gestation</td>
<td>28 weeks</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

Conclusion & Future work

- Discrepancies in the timing of intervention, GDM diagnostic criteria and the different measures used to assess glucose metabolism make it difficult to draw clear recommendations.
- Further studies looking specifically at the effects of different modalities of exercise on glucose metabolism with combined strategies to enhance insulin sensitivity should be explored to maximise benefits for GDM pregnancies.
- Consistency in design and delivery of exercise-only interventions is required to make recommendation on suitable exercise prescription in this population.
- In practice, adherence to consensus in diagnostic cut-offs for GDM diagnosis is fundamental for standardising future research.

References


Acknowledgements

This research project was supported by the University of Limerick through an Education & Health Sciences faculty Postgraduate Dean’s Scholarship. Graduate Entry Medical School Strategic Research Fund and Health Research Institute Seed Funding from the University of Limerick.