Investigating the diagnosis of gestational diabetes...

A designer breakfast put to the test
DECLARATION OF INTERESTS: None
Background

- Obesity Pandemic
  - > 1.9 billion adults overweight in 2014
  - > half a billion obese
  - BIG metabolic footprint
  - 42 million preschool children overweight in 2013

Ng, Marie et al.  
The Lancet, Volume 384, Issue 9945, 766 - 781
Now add Pregnancy ...

- Normal physiological ‘diabetogenic’ state
  - Change in hormonal milieu
  - Relative insulin resistance
  - Weight gain...
Fetal Macrosomia
Shoulder dystocia
Late intra-uterine death
What we know...

- Obesity Pandemic...
- Pregnancy effects...
- Gestational Diabetes (GDM)
Diagnosing GDM

- No global standardization yet
- Universal vs selective screening

75g OGTT

Current Gold Std

Fasting and 2 hour VENOUS samples

Glucose Profile

Patient provided breakfast

Fasting and 2 hour CAPILLARY samples

Diabetes in pregnancy, provincial guideline of the Western Cape, for the management of diabetes and its complications from pre-conception to the postnatal period.
1. To **analyse** the glycaemic content of the non-standardised glycaemic load (patient-provided breakfast)

2. To **design** an affordable, readily available, standardised and user-friendly “breakfast” to be tested during a glucose profile.

3. To **compare** the capillary glucose values of the “designed breakfast” to the venous glucose values of the standard 75g OGTT.
Methods

- 50 patients enrolled in pilot study
- Provided breakfasts carefully recorded in detail
- Carbohydrate content then analysed by a dedicated study dietician...
The results – Patient breakfasts

- 76% Unprepared
- 15-145g carbohydrate range
- 14% in carbohydrate range (75g)

Screening for gestational diabetes: examining a breakfast meal test
C Marais et al. SAJCN 2016
Aims

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### Methods – Designer breakfast

<table>
<thead>
<tr>
<th>Meal test</th>
<th>Protein</th>
<th>Fat</th>
<th>Carbohydrate</th>
<th>Carbohydrate type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7 g (5%)</td>
<td>25 g (41%)</td>
<td>75 g</td>
<td>100% glucose</td>
</tr>
<tr>
<td>CookieHarano et al. 2006[^38]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oral shakeTraub et al. 2012[^21]</td>
<td>30 g (20%)</td>
<td>20 g (30%)</td>
<td>75 g (54%)</td>
<td>85% starch; 15% maltose</td>
</tr>
<tr>
<td>MuffinTraub et al. 2012[^21]</td>
<td>6 g (6%)</td>
<td>18 g (40%)</td>
<td>56 g (55%)</td>
<td>100% glucose</td>
</tr>
<tr>
<td>WafersWolever et al. 1998[^19]</td>
<td>12 g (14%)</td>
<td>11 g (28%)</td>
<td>50 g (58%)</td>
<td>82% starch; 18% sugars</td>
</tr>
<tr>
<td>10 candy twists Racusin et al. 2015[^22]</td>
<td>2 g (4%)</td>
<td>1 g (5%)</td>
<td>50 g (92%)</td>
<td>Mostly sugars</td>
</tr>
</tbody>
</table>

*Macronutrient distribution is given as a percentage of the total energy.*
Aims

1. To analyse the glycaemic content of the non-standardised glycaemic load (patient-provided breakfast)

2. To “design” an affordable, readily available, standardised and user-friendly “breakfast” to be tested during a glucose profile.

3. To compare the capillary glucose values of the “designed breakfast” to the venous glucose values of the standard 75g OGTT.
Methods

- Randomised crossover design (n=50)

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<th>Venous</th>
<th>Capillary</th>
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The big comparison

- Randomised crossover design (n=50)

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Pearsons (r) = 0.74  
P < 0.001

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### OGTT vs GP

<table>
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<tr>
<th>Time</th>
<th>Pearson’s correlation coefficient</th>
<th>Interclass correlation coefficient</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fasting values</td>
<td>$r = 0.64$</td>
<td>$r = 0.63$</td>
<td>$p &lt; 0.001$(both)</td>
</tr>
<tr>
<td>2 Hour Values</td>
<td>$r = 0.54$</td>
<td>$r = 0.46$</td>
<td>$p &lt; 0.001$(both)</td>
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Conclusion

- Good correlation between Capillary and Venous samples within OGTT
- Good correlation between OGTT and designed breakfast glucose profile

OGTT
- Lab Equipment
- Expensive
- Unpalatable
- Reproducible?

Glucose Profile
- On site
- Inexpensive
- Palatability
- Good correlations
Conclusion

The designed breakfast glucose profile is a sufficiently reliable and palatable alternative to the current 75g OGTT.

It certainly merits further investigation.