Maternal morbidity: A life course perspective

Non-communicable diseases and related conditions in pregnancy

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A life course approach

Social & environmental context, lifestyle

Early life → Menarche → Reproduction & pregnancy → Menopause

Body size, function, physical & mental health, genes

Health in later life

Adapted from Mishra et al Maturitas 2010, RCOG 2011, Scientific Impact paper no. 27
Non-communicable diseases and pregnancy outcome

<table>
<thead>
<tr>
<th>Category</th>
<th>Immediate</th>
<th>Longer term</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ENDOCRINE/METABOLIC</strong></td>
<td>Glycemic control, other complications</td>
<td>Maternal chronic hypertension, obesity</td>
</tr>
<tr>
<td>e.g. diabetes mellitus</td>
<td>Macrosomia</td>
<td></td>
</tr>
<tr>
<td><strong>CARDIAC</strong></td>
<td>Obstructed labour</td>
<td>Future need for Caesarean section</td>
</tr>
<tr>
<td><strong>GASTROINTESTINAL</strong></td>
<td>Increased risk of infection</td>
<td></td>
</tr>
<tr>
<td><strong>HAEMATOLOGICAL</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>REPRODUCTIVE TRACT</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ETC...</td>
<td></td>
<td>Development and health of offspring</td>
</tr>
</tbody>
</table>
The burden of non-communicable diseases in pregnancy

Global causes of maternal mortality

- Indirect: 27.5%
- Direct: 72.5%

Cause, indirects %
- HIV: 5.5
- Pre-existing medical conditions: 14.8
- Other indirect: 7.2

Say et al 2014
Gestational diabetes mellitus (GDM) in pregnant women, population based studies in LMIC
Adverse outcomes, pregnant women with GDM, LMIC

Median (of interquartile range) incidence reported

**Neonatal**
- Low birth weight
- Hypoglycemia
- Macrosomia
- Jaundice
- Large for gestational age

**Maternal**
- Polyhydramnios
- Preterm labour
- Pregnancy induced hypertension
- Vaginal candidiasis
- Caesarean

Wang et al 2013
### Adverse outcomes, GDM
LMIC compared to industrialised countries

<table>
<thead>
<tr>
<th>Outcomes, %</th>
<th>LMIC Median, (interquartile range)</th>
<th>USA</th>
<th>UK</th>
<th>Australia</th>
<th>Sweden</th>
<th>Italy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caesarean section</td>
<td>43.8 (34.9-65.9)</td>
<td>30.0</td>
<td>28.0</td>
<td>30.2</td>
<td>21.7</td>
<td>34.9</td>
</tr>
<tr>
<td>Stillbirth</td>
<td>2.6 (0.6-6.3)</td>
<td>0.5</td>
<td>-</td>
<td>0.3</td>
<td>0.4</td>
<td>0.34</td>
</tr>
</tbody>
</table>

Wang et al 2013
Co-morbidities in diabetic women who died, Jamaica

Kanguru 2015
Pregnancy outcomes as ‘primordial prevention’?

Adverse pregnancy outcome and risk of future cardiovascular mortality

<table>
<thead>
<tr>
<th>Adverse pregnancy outcome</th>
<th>Relative risk (range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low birth weight</td>
<td>1.23–1.49</td>
</tr>
<tr>
<td>Fetal growth</td>
<td>1.44–2.56</td>
</tr>
<tr>
<td>Preterm birth</td>
<td>2.06–2.45</td>
</tr>
</tbody>
</table>

*offspring birth weight inversely associated with cardiovascular and all-cause mortality

Bohrer and Ehrenthal 2015
Body mass index (BMI) trends 1980-2008

- Rate of change in women similar across all regions of SSA
- Highest baselines in Southern Africa at 26 kg/m²

*Finucane et al Lancet 2011*
Obesity in urban women in seven sub-Saharan African countries

Urban: From 23% (Malawi) to 38% in Kenya

Rural: From 4% (Burkina Faso) to 18% in Kenya

Ziraba et al, 2009
Are women of different weight categories receiving ‘life saving’ care (proxy CS)?
Is the difference observed in CS across BMI categories independent of other exposures?

Nigeria*

<table>
<thead>
<tr>
<th>BMI (Ref: 18.5-24.9)</th>
<th>Unadjusted</th>
<th>Adjusted**</th>
</tr>
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<tbody>
<tr>
<td>&lt;18.5</td>
<td>0.60 (0.42-0.86)</td>
<td>0.89 (0.62-1.28)</td>
</tr>
<tr>
<td>25-29.9</td>
<td>2.78 (2.30-3.36)</td>
<td>1.68 (1.39-2.14)</td>
</tr>
<tr>
<td>&gt;=30</td>
<td>5.92 (4.80-7.30)</td>
<td>2.83 (2.26-3.54)</td>
</tr>
</tbody>
</table>

*includes non-pregnant WRA only

**adjusted for year, wealth, education, residence, parity, religion, age
Where are we now?

- Falling levels of maternal mortality over the last 25 years
- Interventions have focused on maternity services
- Less attention has been paid to maternal morbidity, including those related to the general health of women
- Limited evidence on burden of NCDs in pregnancy in LMIC

The ‘Obstetric transition’: emerging demographic transition in LMIC (Souza et al 2014)

- Have we missed an opportunity during pregnancy to reduce risks of chronic diseases later in life?
- Is the added value of addressing NCDs in pregnancy also going to reduce risks of obstetric complications?
  - e.g. sepsis could be reduced by attention to pre-existing conditions like obesity and diabetes
Health systems for NCDs in pregnancy

“Health-system re-engineering is necessary to begin preparations for the new challenges that lie ahead.....many health systems are inadequate to meet the needs of an increasing number of pregnant women with pre-existing conditions and high-risk pregnancies”.

Kassebaum et al 2014

The burden is great and the money little:
Changing chronic disease management in low- and middle-income countries

Daniel D. Reidpath, Pascale Allotey

“A health system designed to deliver longitudinal management of a chronic health condition is distinctly different from one designed for the management of serial acute episodes”

JoGH 2012