WASH and maternal & reproductive health

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Overview

1. Maternal health and WASH:
   Historical lesson
   Conceptual framework shows multiple mechanisms
   Epidemiological evidence: systematic review results

2. Case studies - Burden of poor WASH:
   Domestic birth settings
   Facility birth settings

Complex relationship requiring intersectoral action
Vienna, 1847

Poor hygiene in health facilities - Semmelweis
Today: Global picture (Sanitation)

Source: Gapminder.org
Today: Global picture (Water)

Source: Gapminder.org
Millennium Development Goals 1990-2015

MDG 5A: Reduction of maternal mortality ratio by three quarters.

MDG 7C: To halve... the proportion of the population without sustainable access to safe drinking water and basic sanitation.
Insufficient progress on maternal mortality

Progress on domestic access to water & sanitation

780 million without access to safe drinking water

2.5 billion without access to safe sanitation
WASH & Maternal Mortality

Causes of maternal mortality

- Abortion 9%
- Hypertension 18%
- Other direct 11%
- Indirect 18%
- Sepsis 8%
- Haemorrhage 35%
- Embolism 1%

Significant proportion of maternal deaths caused by sepsis
Conceptual framework: WASH links with maternal/reproductive health

Three lenses:
1. WASH transmission (biological)
2. Life-course (long-term perspective)
3. Gender (social and behavioural)

1. In the water
2. Behaviour & location
Life course perspective on potential impacts

- Low birth weight
- Morbidity
- Infections: cord, skin & eye
- Infections: enteric, parasitic, respiratory
- Unacceptable child health services
- Stunting
- Anaemia, rheumatic disease
- Cognitive impairment
- UTI
- Unacceptable schools
- School absenteeism/dropout
- Harassment, rape
- Orphans
- Early marriage
- Unacceptable FP services
- Opportunity costs
- Pelvic inflammatory disease
- Spinal compression
- Prolapse
- Caloric expenditure
- Early childbearing
- Infertility
- Stigma
- Anaemia
- UTI
- Unacceptable ANC, delivery & PNC services
- Obstructed labour
- Cardiac disease
- Repeated pregnancy
- Maternal Death
- C-section
- Maternal Death
- Spontaneous abortion
- Stillbirth
- Poor mental health
- Early marriage
- Infertility
- Stigma
- Caloric expenditure
- Short adult
- School absenteeism/dropout
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- Caloric expenditure
- Short adult
Systematic literature review

Evidence base is limited
   - 14 articles (5 individual-level, 8 ecological, 1 facility-based)

Observational nature of studies
   - Potential for residual confounding, especially by socio-economic status
## Meta-analysis of individual level studies

### SANITATION

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Country</th>
<th>Comparison</th>
<th>Type</th>
<th>Adjusted only:</th>
<th>Weight</th>
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</thead>
<tbody>
<tr>
<td>Golding</td>
<td>1989</td>
<td>Jamaica</td>
<td>Other v. WC</td>
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<td>3.16 (1.56, 6.41)</td>
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<td>Urassa</td>
<td>1995</td>
<td>Tanzania</td>
<td>Other v. flush</td>
<td>Crude</td>
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<tr>
<td>Taguchi</td>
<td>2003</td>
<td>Indonesia</td>
<td>No facility v. any</td>
<td>Adjusted</td>
<td>2.90 (1.00, 7.70)</td>
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<td>Subtotal (I-squared = 0.0%, p = 0.983)</td>
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<td>3.14 (1.98, 4.99)</td>
<td>100.00</td>
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### WATER

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Country</th>
<th>Comparison</th>
<th>Type</th>
<th>Adjusted only:</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Golding</td>
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<td>Jamaica</td>
<td>Other v. piped</td>
<td>Crude</td>
<td>2.04 (1.21, 3.46)</td>
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<td>Tanzania</td>
<td>Not tap v. tap</td>
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<td>2.60 (1.70, 4.00)</td>
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<td>Fikree</td>
<td>1997</td>
<td>Pakistan</td>
<td>Not potable v. potable</td>
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<td>Taguchi</td>
<td>2003</td>
<td>Indonesia</td>
<td>Not clean v. clean</td>
<td>Crude</td>
<td>0.90 (0.39, 1.98)</td>
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<td>Subtotal (I-squared = 57.5%, p = 0.070)</td>
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<td>1.75 (1.21, 2.54)</td>
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**NOTE:** Weights are from random effects analysis
Burden of poor WASH in domestic and facility birth settings

India, Bangladesh, Malawi, Tanzania

Demographic and Health Surveys
Definition of WASH in home settings

Using the UN Joint Monitoring Programme definitions for ‘improved’:
1. ‘WASH-safe’ = improved water & sanitation
2. ‘WASH-unsafe’ = lacks either of both

**Improved water source:**
- Piped or protected well into dwelling, yard
- Public tap/standpipe or public well
- Neighbour's tap or borehole
- Rainwater or bottled water

**Improved sanitation:**
- Flush - to sewer, septic tank, pit latrine
- Pit latrine - ventilated improved pit (vip)
- Pit latrine - with slab
- Composting toilet

& is not shared
Home births as % of all births

Figure 1. Proportion of births delivered in the current home among all live births in five years prior to survey, by country

- Tanzania 2010: 42.9%
- Malawi 2010: 10.5%
- India 2005: 47.8%
- Bangladesh 2007: 53.7%

Error bars represent 95% confidence intervals of estimates.
Summary
What we know

- Plausible biological and social mechanisms link WASH with maternal health
- Poor water and poor sanitation environments are associated with higher maternal mortality
- High burden of poor water and sanitation in domestic and facility birth settings exists
- Existing evidence confirms that benefits of improvement may be substantial
Summary

Gaps in evidence

• From 67 identified biological mechanisms, there is no published evidence of link with maternal mortality in 30
• Limitations of observational evidence
• Lack of impact interventions
• Current definitions do not consider quality, distance or cost
• Limited data on hygiene practices (domestic or facility)
• No definition of (birth) facility WASH environments
• Lack of up-to-date facility-level data
• Increase understanding and channel action to improve hygiene on labour wards
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