Burden of Maternal Ill Health and Death
Rural Bangladesh
2007-8

M Koblinsky
Fauzia Huda
Jannat Ferdous
Kaniz Gausia
Allisyn Moran
Jena Hamadani
Ruchira Naved
Rasheda Khan
Lauren S Blum
Enam Hoque
Tim Powell Jackson
Elahi Chowdhury
Carine Ronsmans
The maternal morbidity informational vacuum

- Two major factors contribute to the informational vacuum surrounding maternal ill health—
  - inconsistent use of terminologies to describe maternal morbidities and their consequences, and
  - the methods used to ascertain them quantitatively.
Definitions of maternal morbidity

Maternal Morbidity

Acute Complications: Obstetric or Maternal Complications

Severe Obstetric Complications

Absolute Maternal Indications (AMI)

Severe Acute Maternal Morbidities (SAMM)

Near Miss

Maternal Disability

Chronic

Acute
Data Collection Methods

- **Self reported complications (e.g., surveys)**
  Reliability poor compared with medical records

- **Assessment by community-based health providers**
  Providers --different levels of training, supervision, and equipment to diagnose complications. Reliability and validity is unclear.

- **Assessment by skilled providers in facility**
  “Gold” standard for diagnosis; WHO recently identified criteria to determine severe obstetric morbidities **based on …**
Acute Maternal Morbidity

Consequences (short- & long-term)

Child
- Growth/developmental
  - Education
  - Survival

Family/household
- Social
  - Less social support
  - Change in relationships
  - Child caring problems
  - Change in family structure
  - Violence
- Economic
  - Productivity loss
  - Impoverishment

Woman’s Disabilities
- Physical consequences
  - Incontinence
  - Obstetric fistula
  - Uterine prolapse
  - Dyspareunia
  - Hemorrhoids
  - Hemorrhage
  - Infection
  - Hypertension
  - Maternal nutrition
- Psychological consequence
  - Survival
Specific objectives– Matlab MM project

Determine:

- level of severe and less severe maternal complications of those women who give birth in facilities in Matlab/Chandpur

Compare women with morbidities and those with normal/vag birth for consequences:

- level of physical sequelae cx 6 weeks post-delivery

- newborn outcomes (death, developmental delays)

- Consequences of the consequences: psychological, social and economic impact as well as continued death of children or mother
Study components

A prospective study examining short-term consequences
- Physical
- Psychological
- Social
- Economic
- Child development

A retrospective study examining long-term consequences
- Social
- Survival
Study design – prospective components
Quantitative & qualitative

Women who had severe obstetric complications

Women who had perinatal deaths

Physical consequence
Psychological consequence
Social consequence
Economic consequence

Child developmental
Normal birth (control)

Study design – prospective components
Quantitative & qualitative

Women who had severe obstetric complications

Women who had perinatal deaths

Physical consequence
Psychological consequence
Social consequence
Economic consequence

Child developmental
Normal birth (control)
Data systems - retrospective quantitative study

Data systems

Pregnancy records and demographic data
HDSS

Pregnancy-related mortality
HDSS
Special Verbal autopsies

Socio economic characteristics
Socio economic census
Map of Matlab Study Area

Legend
- ICDDR,B Hospital
- ICDDR,B Subcenter

Main rivers
Divisional boundaries

Govt. Service Area
Block A
Block B
Block C
Block D

GIS unit, ICDDR,B

BANGLADESH

Bay of Bengal

BANGLADESH

Rajshahi
Sylhet
Chittagong
Barisal
Khulna
Dhaka
Matlab

Meghna River
## Socio-demographic and health indicators in Matlab and national level 2006

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Matlab</th>
<th>National</th>
</tr>
</thead>
<tbody>
<tr>
<td>Literacy rate (%)</td>
<td>52.8</td>
<td>51.6</td>
</tr>
<tr>
<td>CPR (%)</td>
<td>56.6</td>
<td>55.8</td>
</tr>
<tr>
<td>TFR (per woman)</td>
<td>2.6</td>
<td>2.7</td>
</tr>
<tr>
<td>Skilled delivery (%)</td>
<td>77.0</td>
<td>18.0</td>
</tr>
<tr>
<td>MMR (per 100,000 lbs)</td>
<td>240.0</td>
<td>322.0</td>
</tr>
<tr>
<td>CS rate (%)</td>
<td>11.8</td>
<td>7.5</td>
</tr>
<tr>
<td>NNMR (per 1000 lb)</td>
<td>20.3</td>
<td>37.0</td>
</tr>
<tr>
<td>Life expectancy (years)</td>
<td>71.8</td>
<td>65.1</td>
</tr>
</tbody>
</table>
Acute maternal morbidities and mortality
Selection of subjects – prospective study

- Bi-weekly home visits by field workers to identify women who delivered in the past 7-15 days
- Bi-weekly record review at facility by physician
- Selection of all women who had severe/less severe delivery complications
- Selection of all women who had perinatal death
- A sample of women who had normal birth (control group)
- A sample of women who had abortion
Delivery place and referral in women giving birth in the Matlab ICDDR,B service area (4817) (2007 - 2008)

2102 records reviewed, 175 (8.3%) not found
Categorization of Acute Maternal Morbidities

- **Severe**
  - Caesarean section due to absolute maternal indications (placenta praevia, abruptio placenta, major cephalo-pelvic disproportion, severe malpresentation, ruptured uterus, uncontrollable postpartum haemorrhage)
  - Haemorrhage (bleeding with shock or >=2 units of blood)
  - Eclampsia and severe pre-eclampsia
  - Septic shock and septicaemia
  - Severe anaemia (Hb <7g/dl)

- **Less Severe**
  - Caesarean Section with no maternal indications

- **Vaginal delivery with no maternal complications**
Percentages of women with severe and less severe maternal complications (2007-2008) (N=1927 records)

Severe maternal

- Haemorrhage: 12.8%
- Eclampsia & severe pre-eclampsia: 11.3%
- Sepsis: 0.7%
- Severe Anaemia: 7.8%
- Dystocia due to AMI: 67.4%

Less severe maternal

- Dystocia other than AMI: 69.5%
- Other Hypertensive diseases: 13.2%
- Infection: 5.1%
- Moderate Anaemia: 5.8%
- Haemorrhage: 6.4%

*** Absolute maternal indications include ruptured uterus, brow presentation, transverse lie, foeto-pelvic disproportion (including impending rupture of uterus)
Indications for C sections (n=401) in public and private hospitals, Matlab/ Chandpur 2007-2008

*** Absolute maternal indications include ruptured uterus, brow presentation, transverse lie, foeto-pelvic disproportion (including impending rupture of uterus)
12 maternal deaths in 2007-08

✓ Causes:
  - Haemorrhage (n=6)
  - Other direct (n=2)
  - Indirect (n=4)

✓ Care seeking prior to death:
  - Undelivered (n=2)
  - Delivery at home (n=4): 3 went to health facility after delivery, and one woman died on the way
  - Delivery in health facility (n=6)
Summary – Acute morbidities/mortality

Maternal complications:
- Only 7% of women who delivered in facilities had a severe maternal complication,
- Severe dystocia was by far the most common complication among women admitted to health facilities. Admissions for haemorrhage and sepsis were uncommon

Caesarean sections:
- 27.9% for severe cx; 79% of severe cx cases had csection
- 18% for less severe cx; 23% of less severe cx cases had csection

Maternal deaths:
- 50% of maternal deaths were due to haemorrhage
- Most women who die seek care from public or private hospitals
Consequences: Physical postpartum disabilities

Method: Physical exam 6-9 weeks pp on specific sample
## Study design and sample

<table>
<thead>
<tr>
<th>Category</th>
<th>Total sample</th>
<th>Physical exam performed</th>
<th>Facility delivery</th>
<th>Home delivery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute obstetric complication (severe + less severe)</td>
<td>321 - All severe/half less severe</td>
<td>295</td>
<td>All</td>
<td></td>
</tr>
<tr>
<td>Perinatal death</td>
<td>182 - all</td>
<td>156</td>
<td>111</td>
<td>45</td>
</tr>
<tr>
<td>CS without any maternal indication</td>
<td>147 - all</td>
<td>125</td>
<td>all</td>
<td></td>
</tr>
<tr>
<td>Normal delivery without any maternal complications</td>
<td>538 sample</td>
<td>482</td>
<td>232</td>
<td>250</td>
</tr>
</tbody>
</table>
Morbidities at 6-9-weeks postpartum: acute obstetric complication vs normal delivery cases
Morbidities at 6-9-weeks postpartum: perinatal death vs normal delivery cases

- Statistically significant at 5%
Morbidities at 6-9-weeks postpartum: c-section vs normal delivery cases

Statistically significant at 5%
Variations in survival of children of mothers with acute maternal morbidities

Statistically significant at 5%
Summary – Physical Disabilities

- Women with complications in childbirth are more likely to experience:
  - Hypertension, moderate anemia, hemorrhoids
  - Neonatal death

- Women with complications in childbirth are less likely (than normal vag births) to experience genital prolapse and perineal tears. This may be related to caesarean section.
Consequences of the consequences
Consequences: Coping with costs
Household costs of health seeking due to maternal morbidity

Loss of resources (Taka)

6 weeks
6 months
12 months

Severe complication
Less severe complication
Normal

1 US$ = 69 Taka
Financial burden of cost of health care

Health care costs as % of annual consumption

- Severe complication
- Less severe complication
- Normal

Poorest  Poorer  Middle  Richer  Richest
Loss of resources by morbidity group up to 6 weeks postpartum

- Severe complication: 83%
- Less severe complication: 86%
- Normal: 56%

1 US$ = 69 Taka
Source of OOP expenditure
6 weeks postpartum

Severe complication
Income and savings
Mortgage
Other source

Less severe complication
Loan with interest
Donation

Normal delivery
Loan without interest
Sale of assets

icddr,b
KNOWLEDGE FOR GLOBAL LIFESAVING SOLUTIONS
Coping strategies: loans and sale of assets (Taka)

Note: Comparison group is women with a normal delivery
Summary - Costs and Coping

Household costs of maternal health seeking are high (nearly $300 if have complications) and the financial burden is greatest among the poorest.

Households with an obstetric complication appear to cope – they do not cut back on consumption.

Households cope through use of income and savings and donations, but also by the use of loans and selling assets. These may have economic consequences beyond our study period.

Families with obstetric morbidity struggle to pay back loans.

The poorest are in need of financial protection.
Depression and social consequences in women with and without Perinatal deaths

<table>
<thead>
<tr>
<th></th>
<th>Crude (95% CI)</th>
<th>Odds Ratios Adjusted (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depression at 6 week</td>
<td>3.72 (2.45 – 5.66)</td>
<td>3.83 (2.39 – 6.15)</td>
</tr>
<tr>
<td>Depression at 6 month</td>
<td>1.14 (0.64 – 2.04)</td>
<td>0.55 (0.28 – 1.10)</td>
</tr>
<tr>
<td>Negative social consequences**</td>
<td>3.34 (2.18 – 5.12)</td>
<td>2.90 (1.80 – 4.69)</td>
</tr>
</tbody>
</table>

- Adjusted for age, parity, maternal education, residential area and asset quintile.

** Includes: Negative life changes; worse relationship with marital family, with husband
Exposure to VAW since delivery by birth outcome
6m survey, Matlab, 2007-2008

**p<0.001; *p<0.01
Tip of the iceberg - Bangladesh

1 maternal death = 12 severe cx; 26 less severe cx or 38 cx total (about 20 mill worldwide)

Consequences:
Over 40% of all women who deliver have a physical disability over first 6-9 weeks
Hypothesis and results

• Women with severe obstetric complications suffer more long-term consequences (physical, social, mental) or death compared to those with normal deliveries with no complications

– Physical:
  • Severe complications lead to maternal death
  • Physical consequences are common (over 40%) but relatively mild—e.g., first degree prolapse, hemorrhoids, and hypertension

– Social: The few women with very severe consequences, e.g., fistulas, stress incontinence, 2nd/3rd degree prolapse, experience devastating social repercussions—stigma, verbal abuse, suicidal ideation.

– Mental: There is no significant and lasting depression.
Hypothesis and results

- Women with severe and less severe obstetric complications and those who die have poorer pregnancy outcomes (stillbirths, neonatal death, infant death) compared to those with normal deliveries with no complications
  - Perinatal deaths are twice as likely and neonatal deaths five times more likely among women with severe and less severe complications
  - Infant mortality is about eight times higher in the case of a maternal death
  - If a mother dies, eight of ten children under of age 10 are likely to die compared with 1 of 10
  - The consequence of a perinatal death on the mother includes postpartum depression, and emotional violence and controlling behavior from the family and community.
Hypothesis and results

• A child of a mother suffering consequences of severe ob complications is at higher risk of death, poorer growth and development than those of women without such consequences
  – No evidence of developmental delays in relation to maternal morbidities

• Families of women who suffered severe ob complications (and/or poor pregnancy outcome) are at higher risk of impoverishment
  – Cost of intrapartum care is very high in relation to HH income, especially amongst the poorest, but on average family’s cope through loans and to a lesser degree by selling assets.
Recommendations

1. Strongly encourage facility delivery with good quality care to ensure good outcomes for both mother and newborn at delivery and beyond.

2. Ensure that any woman with a severe or less severe complication remains in the facility for at least 24 hours with appropriate CEmNC.

3. Those with hemorroids and prolapse could be attended to during the facility stay.

4. Improve community level knowledge about specific danger signs and sites of EmOC must continue, and at facility level, efforts need to be initiated to improve appropriate referral and linkages.
Policy recommendations

1. Promote postpartum follow up by 6 weeks of all women, not only for newborn care and family planning, but also for hypertension, hemorrhoids and anemia (especially for those with complications) and for prolapse and perineal tears (especially if they delivered at home, are of higher parity and age). Continue follow up for up to one year to avert further maternal and infant death.

2. Target households/women with a perinatal death for family counseling for postpartum depression, domestic violence, social impact.

3. Financial protection is needed for the poorest to encourage use of facilities for delivery and prevent families being further impoverished.
Thank You!

And thanks to ICDDRb staff, Natasha Massouda, USAID, DFID, MCHIP and JSI