Born To Die in the First Month of Life: Causation, Inequities & Social Disparities

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Neonatal Pediatrics

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Global Scenario: Under-5 Deaths

5.9 Million deaths <5 yrs old
16,000 deaths/day
1 in 12 children in Africa
1 in 19 children in Southeast Asia
Global Poverty Map
40% will die within their first month of life

- 3.1 Million newborn deaths/year
- 14% of U5 deaths due to complications of prematurity
- 1.1 Million preterm deaths/year
MDG 2015 Report Recommendation

Focusing on newborns is critical to further accelerating progress in child survival

Number of deaths by day in the first 28 days of life, 2013 (thousands)

- 1 million deaths on the first day of life = 36% of neonatal deaths
- 2 million deaths in the first week = 73% of neonatal deaths
Majority of the countries made little progress in achieving their targets 2015

Every 2 minutes, 1 newborn dies

1 dot represents 100 neonatal deaths

209,000 neonatal deaths in the **Western Pacific Region** every year

*WHO Global Health Observatory, 2011*
Prematurity: A direct & Indirect Cause of newborn death

Figure 1. Estimated distribution of causes of 3.1 million neonatal deaths in 193 countries in 2010. Source: Updated from Lawn et al., 2005, using data from 2010 published in Liu L, et al., 2012.
TOP 10 COUNTRIES for preterm births

Blencowe et al. Born Too Soon: The Global Epidemiology of Preterm Births 2013
Philippines' Scenario

**U5 Deaths**: 28/1,000 live births

**45% Newborn Deaths**: 13/1,000 live births

- **Total Live Births**: 2.3 Million (2015)
- **Under 5 Deaths**: 66,000
- **Neonatal deaths**: 29,700
  - 81 newborn deaths/day
  - 17 preterm deaths/day
Low Birth Weight

• Defined as birth weight <2500 g
• Single most important determinant of chances of survival and future development
• Easier to measure and globally feasible compared to gestational age assessment

• Includes:
  • Preterm babies
  • Term babies who are growth-restricted
Low Birth Weight Babies (<2500g): Heterogenous Population

Figure 3: Prevalence of SGA, preterm births, and LBW by UN-MDG region in 2010
AGA=appropriate for gestational age. SGA=small for gestational age. LBW=low birthweight.

Lee et al. Global Statistical Estimates on Preterm & LBW. Lancet 2013
Public Health Implications of Being Born LBW <2500g

Lee et al. Global Statistical Estimates on Preterm & LBW. Lancet 2013
Global Map of Small for Gestational Age Babies

Figure 2: Estimated prevalence of SGA births in 138 low-income and middle-income countries
SGA = small for gestational age.
<table>
<thead>
<tr>
<th>Rank</th>
<th>Country</th>
<th>Livebirths in 2010</th>
<th>NMR 2010</th>
<th>LBW births</th>
<th>Preterm births</th>
<th>Term-SGA births</th>
<th>Preterm-SGA births</th>
<th>Number of SGA births (uncertainty range)</th>
<th>SGA prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>India</td>
<td>27000000</td>
<td>33.1</td>
<td>7507200</td>
<td>3519100</td>
<td>12000000</td>
<td>784600</td>
<td>12800000 (11500000-14300000)</td>
<td>46.9%</td>
</tr>
<tr>
<td>2</td>
<td>Pakistan</td>
<td>4700000</td>
<td>36.1</td>
<td>1232800</td>
<td>748100</td>
<td>2061300</td>
<td>166800</td>
<td>2228100 (2012200-2529800)</td>
<td>47.0%</td>
</tr>
<tr>
<td>3</td>
<td>Nigeria</td>
<td>6300000</td>
<td>40.2</td>
<td>740900</td>
<td>773600</td>
<td>1379500</td>
<td>124200</td>
<td>1503800 (1275300-1709100)</td>
<td>23.7%</td>
</tr>
<tr>
<td>4</td>
<td>Bangladesh</td>
<td>3000000</td>
<td>27.5</td>
<td>656100</td>
<td>424100</td>
<td>1108500</td>
<td>94600</td>
<td>1203000 (1071800-1369200)</td>
<td>39.6%</td>
</tr>
<tr>
<td>5</td>
<td>China</td>
<td>17000000</td>
<td>9.4</td>
<td>398400</td>
<td>1172300</td>
<td>810700</td>
<td>261400</td>
<td>1072100 (648300-1817600)</td>
<td>6.5%</td>
</tr>
<tr>
<td>6</td>
<td>Indonesia</td>
<td>4400000</td>
<td>15.9</td>
<td>485300</td>
<td>675700</td>
<td>891600</td>
<td>150700</td>
<td>1042300 (814800-1309300)</td>
<td>23.8%</td>
</tr>
<tr>
<td>7</td>
<td>Ethiopia</td>
<td>2600000</td>
<td>32.4</td>
<td>530400</td>
<td>263400</td>
<td>795700</td>
<td>42300</td>
<td>838000 (698900-957600)</td>
<td>32.1%</td>
</tr>
<tr>
<td>8</td>
<td>Philippines</td>
<td>2300000</td>
<td>12.6</td>
<td>459500</td>
<td>348900</td>
<td>708900</td>
<td>77800</td>
<td>786700 (641600-937900)</td>
<td>33.6%</td>
</tr>
<tr>
<td>9</td>
<td>Democratic Republic of Congo</td>
<td>2900000</td>
<td>47.4</td>
<td>275800</td>
<td>341400</td>
<td>574600</td>
<td>54800</td>
<td>629500 (523000-754900)</td>
<td>21.9%</td>
</tr>
<tr>
<td>10</td>
<td>Sudan</td>
<td>1400000</td>
<td>31.5</td>
<td>438600</td>
<td>188300</td>
<td>565000</td>
<td>30200</td>
<td>595200 (485900-696600)</td>
<td>41.7%</td>
</tr>
</tbody>
</table>

NMR=neonatal mortality rate. LBW=low birthweight. SGA=small for gestational age.

Table 3: Top ten countries with the highest numbers of SGA infants born in 2010
Philippines: No. 1 in Regional LBW Estimates

- Philippines: 20
- Myanmar: 15
- Lao PDR: 14
- Cambodia: 11
- Brunei: 10
- Timor: 10
- Malaysia: 10
- Indonesia: 9
- Thailand: 9
- Vietnam: 9
- Singapore: 8
Causative Factors of Low Birth Weight: (Born Too Soon or Born Too Small)

**Prematurity**
- Spontaneous Prematurity
  - Maternal age & pregnancy spacing
  - Multiple pregnancy
  - Infections
  - Maternal chronic medical conditions
  - Nutritional factors
  - Lifestyle/work-related factors
  - Maternal psychological health
  - Previous Preterm Delivery
  - Genetic & others

- Provider-Initiated Preterm Birth
  - Obstetric indication
  - Fetal indication

**In-Utero Growth Restriction**
- Maternal
  - Same factors that cause prematurity
  - Short Stature
  - Environmental exposures
    - Tobacco smoke
    - Illicit drugs
    - Alcohol
    - Lead
    - Air Pollution
  - Social Conditions
    - Poverty
    - Domestic Violence
    - Stress
    - Single parenthood

- Fetal
  - Chromosomal anomalies
Recommended Interventions: Dual Track Model

WHO recommendations for improving outcomes of preterm birth 2015

**Prevention of preterm birth**
1. Preconception care package especially family planning
2. Antenatal care package
3. Effective childbirth care
4. Policy support including smoking cessation and employment safeguards of pregnant women

**Preterm newborn care**
1. Essential and extra newborn care, especially feeding support
2. Kangaroo Mother Care
3. Management of premature babies with complications especially RDS, infections and jaundice
4. Neonatal resuscitation
5. Comprehensive neonatal intensive care

**Management of Preterm Labor**
- Tocolytics to slow down labor
- Antenatal corticosteroids
- Antibiotics for pROM
- MgSO₄ for neuroprotection

**Reduction of Preterm Birth**

**Mortality Reduction Among babies born preterm**
## Packaged Interventions Modelling Scenarios

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Scenario 1</th>
<th>Scenario 2</th>
<th>Scenario 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antenatal steroids for preterm labor</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Kangaroo mother care</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Early breastfeeding (within 1 hour of birth)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Injectable antibiotics for neonatal infection</td>
<td></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Antibiotics for p/PROM</td>
<td></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Resuscitation of asphyctic newborn at birth</td>
<td></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Staff hand washing with soap &amp; water</td>
<td></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Surfactant for RDS</td>
<td></td>
<td></td>
<td>Yes</td>
</tr>
</tbody>
</table>

Calibo A. DOH Philippines: Scaling up Early Essential Newborn Care Interventions 2014
Modelling results

S1 – 3 interventions  S2 – 7 interventions  S3 – 8 interventions

Impact (% reduction) NMR

Cost (millions PHP)
5-year Facility-Based KMC projects- Philippines

- Trained: 72 hospital facilities
- Total number of licensed health care facilities: 1,233
- Coverage rate: 5.8%
- Regional Centers of Training: 15
- Even with second level of training available, coverage rate still low
Socio-economic Disparities: Impact on Survival

- The Child in the rural area is 1.7x more at risk of dying than those in the city
- The poorest is almost 2x more likely to die before 5 yrs old
- Children born to uneducated mothers will be 1.5x more at risk of death
- Children born to educated mothers have 2.8x higher chances of survival
Summary

• Close to half (40%) of children under-5 will die within the first month of life (newborn period)

• Half of newborn deaths is attributable to prematurity and its complications

• The global prematurity and LBW map closely approximates the poverty map of the world

• Causative factors of prematurity and LBW are mostly related to socio-cultural factors and environmental exposures which calls for more research

• Access to and application of recommended package of interventions by concerned countries remain low