Global Neonatal Mortality

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• “A shocking reality of global child health is the sheer magnitude of child mortality”
  • Barbara Oettgen, Ambika Mathur
  • The Reality of Child Mortality
Key Data Periods for Child Mortality

Neonatal Mortality
  Deaths in the first 28 days
  Subdivisions: 1st 24 hrs., 1st 7 days
Post Neonatal Mortality
  Deaths occurring 1 month -59 months
Infant Mortality
  Deaths occurring in the 1st year of life
  Includes neonatal period
Under 5 Mortality
  Deaths occurring birth to age 5
Millennium Development Goals

• 8 world-wide goals established at the UN-sponsored Millennium Summit in 2000
• 189 governments and 23 international organizations
• Deadline: 2015
• MDG 4: reduce child mortality
  – “Reduce by 2/3, between 1990 and 2015, the under-5 mortality rate.”
The Millennium Development Goals Report 2015
GOAL 4: REDUCE CHILD MORTALITY

Global number of deaths of children under five

- The global under-five mortality rate has declined by more than half, dropping from 90 to 43 deaths per 1,000 live births between 1990 and 2015.

- Despite population growth in the developing regions, the number of deaths of children under five has declined from 12.7 million in 1990 to almost 6 million in 2015 globally.

- Since the early 1990s, the rate of reduction of under-five mortality has more than tripled globally.

Global measles vaccine coverage

- In sub-Saharan Africa, the annual rate of reduction of under-five mortality was over five times faster during 2005-2013 than it was during 1990-1995.

- Measles vaccination helped prevent nearly 15.6 million deaths between 2000 and 2013. The number of globally reported measles cases declined by 67 per cent for the same period.

- About 84 per cent of children worldwide received at least one dose of measles-containing vaccine in 2013, up from 73 per cent in 2000.
Child Mortality

• “New estimates In Levels and trends in child mortality report 2015 released by UNICEF, WHO, the World Bank Group, and the Population division of UNDESA, indicate that although the global progress has been substantial, 16,000 children under 5 still die every day. “

  • Joint WHO/Unicef/World Bank news release
  • September 9, 2015
Infant Mortality

Deaths per 1000 Live Births

Less Developed Regions

WORLD

More Developed Regions

Years


John Kattwinkel Pediatrics 2013;131:e579-e581
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
Key Data Periods for Child Mortality

- Approx. 45% of Under-5 deaths are neonatal
- Approx. 75% of Neonatal deaths occur in the 1\textsuperscript{st} week

$\Rightarrow \ 1/3 \ of \ Under-5 \ deaths \ occur \ in \ the \ 1\textsuperscript{st} \ week$
Where are the deaths occurring?

• Global statistics fail to describe the great inequality of childhood mortality rates from country to country.
• Accurate data difficult to obtain
• Most child deaths are concentrated in 60 developing countries
• Africa and Asia represented a combined 93% of the deaths
Countries in dark red are making slowest progress for newborn survival, 29 countries need to at least double progress to meet post 2015 targets.
Where are the deaths occurring?

• Approximately 2/3 of deaths are concentrated in Africa and southeast Asia where the neonatal mortality rate is approximately 41 per 1000 live births vs. 3 per 1000 in industrialized countries.
Neonatal cause of death-US

• Leading causes of death
  – Congenital malformations, deformations and chromosomal abnormalities
  – Disorders related to short gestation and low birthweight
  – Sudden infant death syndrome

• CDC, Final Data for 2013
Neonatal cause of death-developing countries

• Primary causes of neonatal death are
  – Infection- 36%. Includes sepsis/pneumonia, tetanus and diarrhea
  – Preterm birth-28%
  – Asphyxia-23%
    • WHO Newborn Death and Illness, 2011
Reducing Neonatal Mortality

• Effective interventions that may reduce neonatal deaths include:
  – Improved skill in neonatal resuscitations
  – WHO -Essential Newborn Care course
  – Helping Babies Survive-Essential Care for Every Baby
Reducing Neonatal Mortality
Neonatal Resuscitation Program

• Developed by the American Academy of Pediatrics and the American Heart Association
• Trained over 3 million individuals in the US alone
• It’s success has led to over 130 countries in the developed and developing world to adopt its curriculum.
Neonatal Resuscitation Program

• But for developing countries is this the best way to teach resuscitation skills?
• Births in the US occur in facilities with very different environment, equipment and personnel than in developing countries where home births predominate and are attended by doulas, traditional midwives or even lay individuals with no formal training.
Estimate of global numbers of babies undergoing resuscitation at birth

- 136 million babies born
- Approx 10 million babies
- Approx 6 million babies
- <1% of babies require advanced resuscitation (endotracheal intubation, chest compressions and drugs)
- Approx 3-6% of babies require basic resuscitation (bag-and-mask ventilation)
- Approx 5-10% of babies require simple stimulation at birth to help them breathe (drying and rubbing)
- All babies require immediate assessment at birth and simple newborn care (assess breathing, dry, and put the baby skin-to-skin with mother)

Int j Gynaecol obstet. 2009 October
Birth Asphyxia

- Each year an estimated 10 million babies require assistance to initiate breathing.
- Between 5% -10% of all babies born in facilities need some degree of resuscitation such as tactile stimulation or airway clearing or positioning.
- Approximately 3-6 % require basic neonatal resuscitation, consisting of the above steps and assisted ventilation.

Int J Gynaecol Obstet. 2009 October
Reducing Neonatal Mortality

Helping Babies Breathe

a global educational program in neonatal resuscitation for birth attendants
Helping Babies Breathe

• Evidence based
• Breathing principles first
• Developed by American Academy of Pediatrics
• Partners include
  – Laerdal Global health
  – USAID
  – NICHD
  – Save Newborn Lives/Save the Children
Graduates!
Reducing Neonatal Mortality- More steps!

- Promotion of early and exclusive breast feeding
- Attention to thermoregulation
- Prevention of infection
- Immunization
- Recognition of signs of illness
Reducing Neonatal Mortality

• “A major barrier to action on neonatal health has been the erroneous perception that only expensive, highly technological care can reduce mortality”

• Cost-effectiveness of Essential Newborn Care Training in Urban First-level Facilities

• Pediatrics 127:5 p1176-1181
Reducing Neonatal Mortality

• Maintain normal temperature
  – Task can be challenging even in warm climates
  – Incidence is high in developing countries
  – Especially critical in premature infants
  – Hypothermia (<36.5 degrees) is associated with
    • Metabolic derangements-hypoglycemia
    • Cardiorespiratory derangements- apnea and bradycardia
    • Even death
Reducing Neonatal Mortality

• Thermoregulation
  – Begins at birth
  – Encourage skin to skin contact
  – Decrease evaporative heat loss
  – Dry blankets, wool hats
  – Keep baby and mother in warm rooms with no drafts
Reducing Neonatal Mortality

Promotion of Breast Feeding

- Key component of child survival
- WHO recommends exclusive breast feeding for first 6 months
  - Benefits include: improved tolerance of feeds, fewer respiratory and GI infections, decreased SIDS
Reducing Neonatal Mortality

• In many cultures mothers discard colostrum, delay the first breast feeding for hours or days or give various fluids and teas

• First milk or colostrum contains large amounts of immunoglobulins, lymphocytes, lactoferrin which protect baby from infection
Delayed Breastfeeding Initiation Increases Risk of Neonatal Mortality

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<table>
<thead>
<tr>
<th>Initiation of Breastfeeding</th>
<th>No. (%) of Infants</th>
<th>No. of Deaths (% risk)</th>
<th>aOR 1 (95% CI)</th>
<th>aOR 2 (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within 1 h</td>
<td>4763 (43)</td>
<td>34 (0.7)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>From 1 h to end of day 1</td>
<td>3105 (28)</td>
<td>36 (1.2)</td>
<td>1.45 (0.90 to 2.35)</td>
<td>1.43 (0.88 to 2.31)</td>
</tr>
<tr>
<td>Day 2</td>
<td>2138 (20)</td>
<td>48 (2.3)</td>
<td>2.70 (1.70 to 4.30)</td>
<td>2.52 (1.58 to 4.02)</td>
</tr>
<tr>
<td>Day 3</td>
<td>797 (7.3)</td>
<td>21 (2.6)</td>
<td>3.01 (1.70 to 5.38)</td>
<td>2.84 (1.59 to 5.06)</td>
</tr>
<tr>
<td>After day 3</td>
<td>144 (1.3)</td>
<td>6 (4.2)</td>
<td>4.42 (1.76 to 11.09)</td>
<td>3.64 (1.43 to 9.30)</td>
</tr>
<tr>
<td>Total</td>
<td>10,947 (100)</td>
<td>145 (1.3)</td>
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</tr>
</tbody>
</table>

LRT indicates likelihood ratio test.

% risk = no. of deaths/no. of infants in exposure category.

b Adjusted for gender, birth size, gestational age, presence of a congenital anomaly, health on the day of birth, health at the time of interview, mother's health at the time of delivery, age of mother, parity, educational level of mother, mother having cash income, household water supply, place of defecation, number of antenatal visits, place of birth, and birth attendant.

c Adjusted for all factors mentioned previously plus established breastfeeding pattern.

d The combined aOR for initiation of breastfeeding after 1 d was 2.88 (95% CI: 1.87 to 4.42).
Reducing Neonatal Mortality

• Prevention of Infection
  – Proper umbilical cord care
    • Cutting the cord with clean instruments
    • Keep cord exposed and dry
    • Do not apply anything to cord including herbs, animal dung or other substances
  – Eye prophylaxis
    • Reduce incidence of eye infections from gonococcal or chlamydia
    • Numerous agents effective- 1% silver nitrate, 1% tetracyline, erythromycin ointment
Reducing Neonatal Mortality

• **Administer Vitamin K**
  – Prevents Hemorrhagic Disease of the Newborn

• **Hepatitis B Vaccination**
  – Important to administer shortly after birth to prevent perinatal transmission

• **HIV prophylaxis**
  – Recommended regimens are in flux and vary from country to country
Within the first 90 minutes, periodically during the first day, and at any time if you suspect a problem

Assess for Danger Signs

- Not feeding
- Too hot or too cold
- Chest indrawing - or fast breathing
- No movement
- Convulsions

To detect problems early and reduce the risk of death
Summary

• Neonatal mortality remains a significant problem throughout the world

• Neonatal mortality contributes significantly to under 5 child mortality rates

• Many interventions –promoting exclusive breast feeding, attention to thermoregulation, etc.-are effective and relatively inexpensive
Thank you

• Thoughts?