

Current Updates on Child Morbidity and Mortality Rates: 2011-2017

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Abstract

The leading causes for death among under-five children changes over a period of time but the cause diarrhea and ARI remains unchanged. India is the leading country in death due to pneumonia. Comparing to the last decade the under five mortality is reduced but it is still not the reduction which is expected. The still birth rate is 22/1000 total birth, perinatal mortality rate is 26/1000 live birth, neonatal mortality rate is 18/1000 live birth, post neonatal mortality rate is 19/1000 live birth, infant mortality rate is 40/1000 live birth, Underfive mortality rate is 48/1000 live birth. More than half of the causes for death can be preventable or treatable through safe childhood and effective neonatal care. The purpose of this review is to understand the present mortality rate and causes for this as well as to get clues for epidemiological research in future.

Keywords: Morbidity; Mortality; Diarrhea, ARI.

Introduction

- Morbidity and mortality from childhood illnesses has remained a major point of interest globally. Around 5.9 million children under the age of 5 years died in 2015.
- The leading causes of death among children under five in 2015 were preterm birth complications, pneumonia, intrapartum-related complications, diarrhoea, and congenital abnormalities. About 45% of all child deaths are linked to malnutrition. India has the largest number of deaths due to pneumonia. In 2015 under five mortality rate is 48 per 1000 live birth,
- But the rate of this reduction in under-5 mortality was insufficient to reach the Millennium Development Goal (MDG) target of a two-thirds reduction of 1990 mortality levels by the year 2015.
- A child's risk of dying is highest in the neonatal period, the first 28 days of life. Prematurity was the largest single cause of death in children under five in 2015. 45% of child deaths under the age of 5 years take place during the neonatal period (2015).
- More than half of these early child deaths are due to conditions that could be prevented or treated with access to simple, affordable interventions. Safe childbirth and effective neonatal care are essential to prevent these deaths.
- Morbidity and mortality indicators are best indicators of health out of all other health indicators.
- Mortality is the condition of being mortal, or susceptible to death; the opposite of immortality
- The morbidity is the condition of being diseased or rate of disease in a population.

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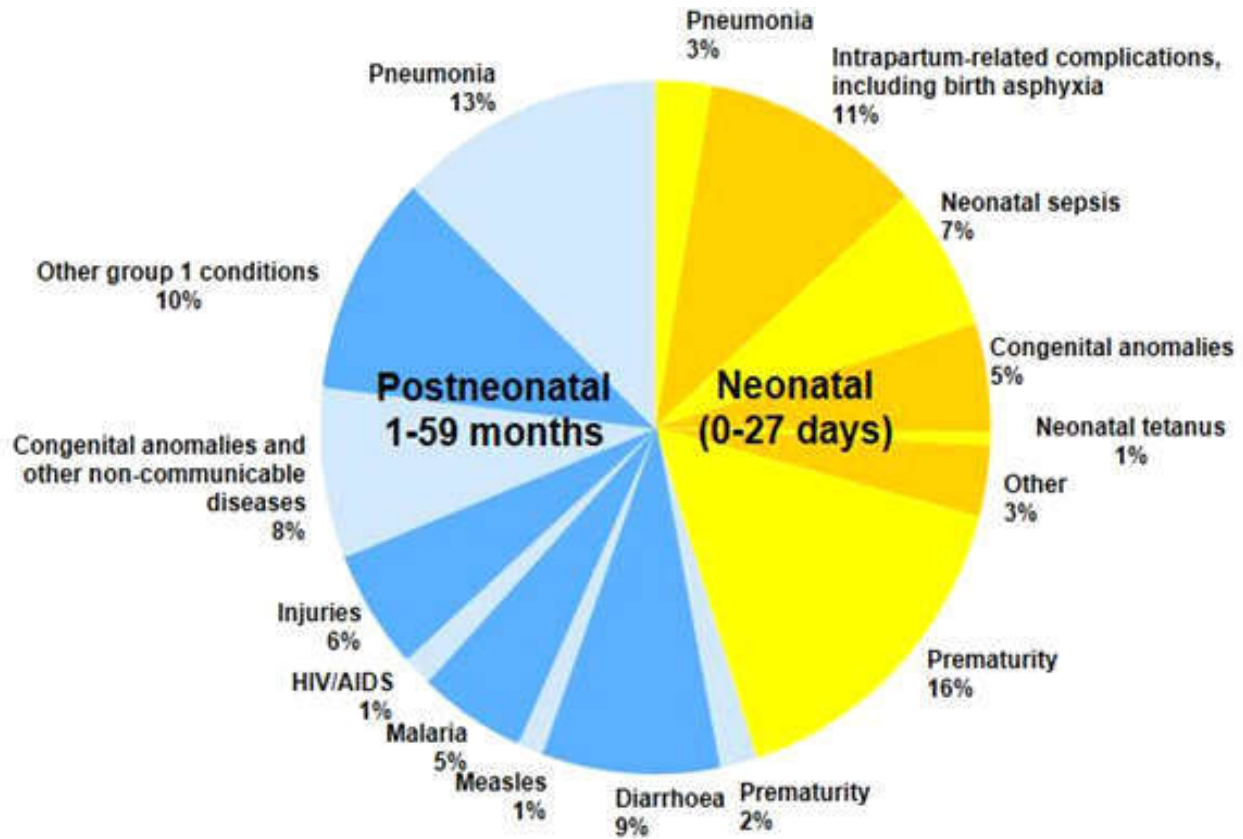


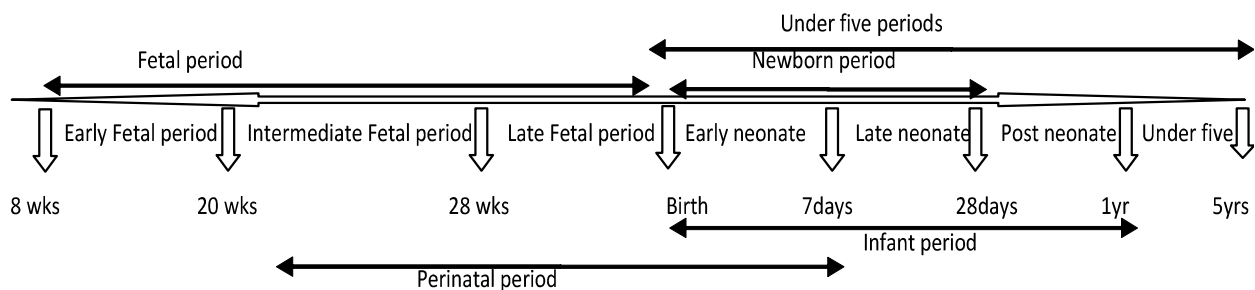
Fig. 1: WHO causes of mortality among under 5 years -2015

Needs/ Importance/Indication for mortality and morbidity indicators

- In explaining trends and differentials in overall mortality
- Indicating priorities for health action and allocation of resources
- In designing intervention programme
- Assessment and monitoring of public health problems and programmes
- Gives clues for epidemiological research

Classification of age till 5 years

- Fetal period: 8 weeks of gestational age to till birth (early + Intermediate +late fetal period)
- Perinatal period: 28 weeks of gestational age to till 7 days after birth (late Fetal +early neonatal + late neonatal period)
- Newborn period: birth to 28 days (Early + Late+ Post neonatal period)
- Infant period: birth to 1 year (Newborn+ Post neonatal period)
- Under five: birth to 5 years (Newborn + Infant+ 1 to 5 years of period)



Child Mortality Indicators

1. *Perinatal mortality rate (PMR) (22weeks of gestation to 7 days after birth):* Perinatal mortality as the “number of stillbirths (death of fetus during 22 weeks to till delivery) and deaths

in the early neonatal period (first week of life) per 1,000 total births, the perinatal period commences at 22 completed weeks (154 days) of gestation and ends seven completed days after birth”, Current PMR is 26/1000 total births in 2013.

$$PMR = \frac{\text{No: of stillbirth and deaths in the 1st week of life} \times 1000 \text{ total births}}{\text{No of live birth}}$$

Table 1: Causes for PMR:

Still birth (22 weeks to till delivery)	Early neonatal period (birth to 7 days)
<ul style="list-style-type: none"> • Abrupton, • Unknown • Severe preeclampsia, congenital anomalies, • Birth asphyxia • Preterm labour • Severe IUGR • Uterine rupture, • Eclampsia • Gestational diabetes • Cord prolapse • Immune hydrops 	<ul style="list-style-type: none"> • Hyaline membrane disease • Meconium aspiration • Extreme prematurity • Sepsis • Congenital malformation • Pulmonary hemorrhage

Neonatal Mortality Rate (NMR) (0-28days)

A neonatal death is defined as a death during the first 28 days of life (0-27 days) for 1000 live birth

divided by total no of live birth. Current NMR is 18/1000 live birth in 2015.

It is classified as early neonatal mortality rate (ENMR) and late neonatal mortality rate (NLNR).

$$ENMR = \frac{\text{No: of death under 7 days after birth} \times 1000 \text{ live births}}{\text{No: of live birth during that year}}$$

$$LNMR = \frac{\text{No: of death from 7 to 28 days after birth} \times 1000 \text{ live births}}{\text{No: of live birth during that year}}$$

Causes

- Intrapartum-related complications (birth asphyxia or lack of breathing at birth) is leading cause for ENMR. (prolonged labor, Birth injury, Hypothermia, HIE, Asphyxia, Neonatal seizure, Neonatal sepsis, Congenital disorder, Bleeding disorder)

- Preterm birth, Infections cause most neonatal deaths in late neonatal period.

Post Neonatal Mortality Rate: (28 days to 1 year): It is defined as the ratio of the postneonatal death in a given years to the total number of live births in the same year, expressed as a rate of 1000 live birth. The current PNMR is 19/1000 live birth in 2011.

$$IMR = \frac{\text{No of death from 28 days to 1yr of age} \times 1000 \text{ live births}}{\text{No of live birth during that year}}$$

Causes

- Diarrhea
- ARI
- Malnutrition

Infant Mortality Rate (IMR) (birth to 1 year): Infant mortality rate is defined as “ the ratio of infant deaths registered in a given year to the total number of live birth registered in the same year; usually expressed as a rate per 1000 live births” The current IMR is 40/1000 live births in 2015.

In India (2013) IMR is 40/1000 live births, Kerala have lowest IMR rate (14 per 1000 live births) and

Uttar Pradesh (83 per 1000 live births) and Orissa (96 per 1000 live births) have highest IMR rate.

$$\text{IMR} = \frac{\text{No. of death under 1yr age X 1000 live births}}{\text{No. of live birth during that year}}$$

- In past times, infant mortality claimed a considerable percentage of children born, but the rates have significantly declined in the West in modern times, mainly due to improvements in basic health care, though high technology.
- Infant mortality rate is commonly included as a part of standard of living evaluations in economics.
- The infant mortality rate correlates very strongly with and is among the best predictors of state failure.
- IMR is also a useful indicator of a country's level of health or development, and is a component of the physical quality of life index. But the method of calculating IMR often varies widely between countries based on the way they define a live birth and how many premature infants are born in the country.
- The World Health Organization (WHO) defines a live birth as any born human being who demonstrates independent signs of life, including breathing, voluntary muscle movement, or heartbeat. Many countries, however, including certain European states and Japan, only count as live births cases where an infant breathes at birth, which makes their reported IMR numbers somewhat lower and raises their rates of perinatal mortality.

Causes of IMR

Leading causes of infant death are

- Congenital anomalies
- Pre-Term Birth/Low Birth Weight
- Sudden Infant Death Syndrome
- Problems related to maternal complications of pregnancy
- Problems related to complications of placenta, cord, membranes
- Respiratory Distress Syndrome
- Accidents
- Diarrhoea
- Pneumonia
- Poison
- Infections

Under Five Mortality Rate(1 to 5 years) : It is defined as the number as the number of death <5 yrs in a given year, per 1000 children in that age group at the midpoint of the year concerned. It thus excludes infant mortality. The current Under 5 Mortality rate is 48/1000 live births in 2015. At 2015 Kerala have lowest Under 5 mortality rate (9 per 1000 live births) and Uttar Pradesh (40 per 1000 live births) and Orissa (39 per 1000 live births) have highest IMR rate.

$$\text{Under 5 mortality rate} = \frac{\text{No of death of children <5 years of age in a given year x 1000}}{\text{No of live birth in the same year}}$$

Child Survival Index

A child survival rate per 1000 birth can be simply calculated by subtracting the under 5 mortality rate from 1000 dividing this figure by ten shows the percentage of those who survive to the age of 5yrs

$$\text{Child survival rate} = \frac{1000 - \text{under 5 mortality rate}}{10}$$

Under 5 Propotionate Mortality Rate: It is the proportion of total death occurring in the under 5 age group . This rate can be used to reflect both

infant and child mortality rate. In communities where sanitation is poor the proportion may exceed to 60%.

Causes of under five mortality

- Pneumonia
- Diarrhea
- Congenital anomaly accident
- Injury
- Accidents
- Poisons
- Infectious Diseases

Causes for Adolescent Mortality

- Suicide
- Accidents

Maternal Mortality Rate (MMR)

Maternal death is defined as the death of a woman while pregnant or within 6 weeks of termination of

pregnancy irrespective of the duration, and the site of pregnancy from any cause related to or aggravated to by the pregnancy or its management but not from accidental or incidental causes. The current MMR is 167/ 100000 live births in 2013. High MMR is reported in Assam (300/1 lack live birth) and low in Kerala (61/ 1 lack live birth).

$$\text{MMR} = \frac{\text{No of female death from pregnancy, child birth, Puerperial causes in an year}}{\text{No of live birth in same area during that year}} \times 1000$$

- According to WHO report 2015 every day about 830 women died due to complications of pregnancy and child birth.
- Almost all of these deaths occurred in low-resource settings, and most could have been prevented
- Maternal mortality is a health indicator that shows very wide gaps between rich and poor, urban and rural areas, both between countries and within them.

- The risk of a woman in a developing country dying from a maternal-related cause during her lifetime is about 33 times higher compared to a woman living in a developed country

Causes

- The primary causes of death are hemorrhage, hypertension, infections, and indirect causes,
- Mostly due to interaction between pre-existing medical conditions and pregnancy.

Table 2: Current MCH mortality indicator in India:

Mortality Indicators	Rate	Years
Still birth rate	22/1000 total birth	2015
Perinatal mortality rate	26/1000 total birth	2013
Neonatal mortality rate	18/1000 live birth	2015
Postneonatal mortality rate	19/1000 live birth	2011
Infant mortality rate	40/1000 live birth	2013
Under five mortality rate	48/1000 live birth	2015
Maternal mortality indicators	167/ 100000 live birth	2013

The new national health policy 2017 aims to reduce mortality rate of children under 5 years of age to 23 (per 1000) by 2025 and maternal mortality rate (MMR) from current levels to 100 by 2020. Reduce infant mortality rate to 28 by 2019. Reduce neo-natal mortality to 16 and still birth rate to 'single digit' by 2025.

Measures to Prevent Mortality

Almost 2/3rd of child deaths are avoidable through following implications.

1. Skilled care: skilled care during pregnancy, childbirth and in the post-natal period
2. Infant feeding: exclusive breastfeeding, complementary feeding and micronutrients, Vital

vaccines: measles and tetanus immunization and other conventional and new vaccines (Hib, pneumococcus, rotavirus) at ages 0-5 years.

3. Combating diarrhoea: low osmolarity ORS and zinc in case management of diarrhoea, antibiotics for dysentery, Exclusive breastfeeding, Adequate sanitation and hygiene, Safe water and food, adequate nutrition and vaccination.
4. Treating pneumonia and newborn sepsis: prompt treatment with appropriate antibiotics
5. Others measures: Combating malaria and preventing and caring for HIV (mother and child), Oxygen for severe illness, Reduction of household air pollution.

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