



Measuring Maternal Mortality

From Research to Practice: Training in Sexual
and Reproductive Health Research
2015

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Background

Since the creation of Millennium Development Goals (MDGs), the need for reliable information on the estimate of maternal death has been growing at national and international levels. (The MDG 5 is to improve maternal health. The targets to assess the MDG 5 are to reduce by three quarters, between 1990 and 2015, the maternal mortality ratio and to achieve by 2015 universal access to reproductive health).

In recent years a number of initiatives have started to accelerate the MDG5 attainments. We can mention two of them:

1. The Commission on Information and Accountability for Women's and Children Health in 2011: This commission includes in its 10 recommendations the improvement of maternal and child death measurement. The Commission calls countries to take necessary steps to establish a well-functioning health information system for the registration of birth, death and causes of death.
http://www.who.int/woman_child_accountability/about/coia/en/
2. Global Strategy for Women's and Children's Health by the United Nations (UN) Secretary General in 2010. This global strategy calls the coordinated action by all stake holders towards the improvement of women and children's health.
http://www.who.int/pmnch/activities/advocacy/fulldocument_globalstrategy/en/



Background (Cont'd)

- The 2013 global estimation for maternal death was 289 000 with a decline of 45% from 1990.
- The sub- Saharan Africa region alone accounts for 62% of global deaths followed by Southern Asia at 24%.
- The global maternal mortality ratio (MMR) for 2013 was 210 maternal deaths per 100 000 live births (It was 380 maternal deaths per 100 000 live births in 1990).
- The 2013 estimates also shows a significant disparity within regions: The maternal mortality ratio was 230 for developing regions and 16 for developed regions. It shows that the MMR in developing regions is 14 times higher than in developed regions.
- Despite the significant progress, reliable data on maternal deaths are still scarce and the policies are developed despite of the lack of data. Only one-third of countries have a complete civil registration system that includes data on causes of death.

Why measure maternal mortality?



Reliable data on causes of maternal death can be used for:

- Policy makers to set priorities based on reliable data and information and to appropriately allocate resources.
- Monitoring and Evaluation.
- Increasing awareness about safe motherhood.
- Encourage accountability.
- Appropriate advocacy.
- Help in raise funds.



Definition of Maternal Death

“The death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental Causes”.



Causes of Maternal Death

Direct causes as result of obstetric complications of pregnant state, such as hemorrhage, eclampsia/pre-eclampsia, complications of anesthesia, caesarean section, incorrect treatment.

Indirect causes as consequence of previous existing diseases, diseases developed during pregnancy or aggravated by pregnancy, such as cardiac or renal diseases.



Alternative Definitions

Pregnancy-related Death:

The death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the cause of death.

Late maternal death:

The death of a woman from direct or indirect obstetric causes, more than 42 days but less than one year after termination of pregnancy.

The first alternative definition allows to measure maternal death, where accurate information, based on medical certificate is not available.

The second definition allows to identify deaths that occur between six weeks and one year postpartum. This method is used in countries with developed registration system.



Challenges with definitions

- Despite the standard definitions accurate identification of the causes of maternal deaths is challenging.
- It is particularly difficult in setting where delivery mostly occur at home.
- It is difficult to identify maternal death precisely in setting without complete recording of deaths in civil registration.
- In most developing countries the death certificate indicating the cause of death does not exist and attribution of death as maternal death is very difficult.
- Even if the civil registration exists, the pregnancy status may not have been known and the death not have been reported as maternal death, even if the women were pregnant.

Coding of maternal death: ICD- MM



- In order to guide countries to reduce errors in coding maternal death and to better attribute the causes of maternal death, WHO published Application of ICD-10 to death during pregnancy, childbirth and the puerperium: ICD Maternal Mortality (ICD-MM).
- For example, the coding of maternal deaths among HIV-positive women may be due to:
- **Obstetric causes:** Such as haemorrhage or hypertensive disorders in pregnancy (In ICD-10-MM it is reported as direct maternal deaths).
- **The interaction between human immunodeficiency virus (HIV) and pregnancy:** which is an aggravating effect of pregnancy on HIV. The interaction between pregnancy and HIV is the underlying cause of death (in ICD-10 MM, it is reported as AIDS-related indirect cause of maternal death).
- **Acquired immunodeficiency syndrome (AIDS):** In these cases the death is the result of HIV complications (in ICD-10 MM it is not reported as maternal death. They are referred as AIDS deaths).

Statistical measures of maternal mortality



Maternal Mortality Ratio

Number of maternal death during a given time-period per 100 000 live birth during the same time-period.

Maternal Mortality Rate:

Number of maternal death in a given period per 100 000 women of reproductive age during the same time-period.

Adult Lifetime risk of maternal death:

The probability of dying from a maternal cause during a woman's reproductive Lifespan.

Approaches to measuring maternal mortality



1. Civil Registration System:

It is a routine, permanent, national and legal source of data and information on vital life events, such as live births, deaths, foetal deaths, marriages and divorces).

Advantages:

- Representative of entire population.
- Does not require special data collection.
- Provides annual statistics on maternal death at national and regional levels.
- Provides cause-specific estimate of maternal mortality.
- Provide data on birth.
- Ideal for monitoring & evaluation.

Limitation

- Poor quality, under-estimation of maternal deaths, attribution of incorrect cause of death.
- It exists only in 78 countries covering only 35% of world population.



2. Household Survey

It is an appropriate important data collection platforms for maternal deaths in settings where routine information collection systems are weak or does not exist.

Advantages:

- Sampling ensures that the target populations are representative.
- Household surveys can also collect information on causes time, place, health care seeking behaviour prior to death.

Limitation:

- Survey identifies pregnancy-related death, not maternal death.
- In epidemiologic terms, maternal deaths are rare events, survey to measure their magnitude requires a large sample size.
- Even with large sample size, the obtained results could be uncertain because of wide confidence interval.



3. Sisterhood methods

This method consists of obtaining information by interviewing a representative sample or respondents about the survival of all their adult sister in order to determine: the number of ever-married sisters, how many are alive, how many are dead and how many died during pregnancy, delivery or within six weeks of pregnancy.

Limitations

- It identifies pregnancy-related deaths, rather than maternal deaths.
- It provides retrospective rather than actual maternal mortality estimate (over 10 years prior to survey).
- It is less appropriate in settings with significant migration and population movement.
- It is difficult to get additional information about deaths (causes, risk factors, timing and etc. as sibling may not have such details).



4. Reproductive-age mortality studies (RAMOS)

It includes identifying and investigating the causes of all deaths of women of reproductive age in a defined geographical area /population. It requires the use of multiple sources of data, such as family members interview, vital registration, health facility records, death records, traditional birth attendants.

Advantages:

In the absence of reliable data collection of registration system, this method is more reliable and can provide subnational Maternal mortality ratios.

Limitations

- It could be long, complicated and expensive, especially if it is implemented on a large scale.
- The number of live birth used in computation and calculation of MMR may not be accurate, especially in places, where women deliver at home.



5. Verbal Autopsy

This method consists of interviewing family members, community members to assign the cause of death. It is used in settings where medical certification of cause of death is not available. It aims to identify maternal death that occur in community and the cause of maternal death.

Advantages:

- It is the only way to ascertain the cause of death, where the deaths happen outside of health facility.
- It can also capture information on social and community factors associated with a maternal death for example barriers to accessing obstetric care.

Limitations:

- Limited reliability of causes of death when reported by a lay-persons, which can be subjective.
- There is a risk of under or over-reporting of cause of death.
- Quality of data collection depends on the quality of training provided to field workers and interviewers and quality of the questionnaire.



6. Census

Advantage:

- No sampling errors.
- Ability to estimate differentials by socioeconomic, geographic variables.
- Well-developed formal evaluation methods.
- It allows identification of death in relatively short reference period (1-2 years).

Limitations

- Generally only held every 10 years, which limit the monitoring of maternal mortality.
- The basic data always need evaluation, and frequently need adjustment.
- The estimates (after adjustment) are for the intercensal period (long reference period).



Reference Document

Trends in Maternal Mortality: 1990 to 2013

Estimates by WHO, UNICEF, UNFPA, The World Bank and the United Nations Population Division

<http://www.who.int/reproductivehealth/publications/monitoring/maternal-mortality-2013/en/>