

Current challenges in pregnancy-related mortality

Charlotte Oyston

Christian F Rueda-Clausen

Philip N Baker

Abstract

Pregnancy is a normal, healthy state that most women are desirous for at some point in their lives. Sadly, this life-affirming process carries serious risks of death and disability for both mother and offspring. Maternal mortality rates are especially high in resource poor countries, despite the fact that 80% of all maternal deaths are preventable. Although maternal mortality is slowly declining, the goal of reducing maternal deaths to a quarter of the 1990 levels, before 2015, remains a challenging target. To achieve this target, care providers, researchers and policy makers must not only identify the key barriers to accessing quality healthcare, but commit to making maternal health a priority.

Keywords death; haemorrhage; infection; maternal; mortality; obstructed labour; pre-eclampsia; resource poor countries; unsafe abortion

Introduction

The death of a mother is a catastrophic tragedy which will impact significantly on her children, partner, families and communities left behind. Maternal mortality is highly related to maternal morbidity and long-term disability and complications. It has been calculated that for every woman who dies from a pregnancy-related cause there are an average of 16.5 cases of significant maternal illness or disability related to pregnancy. Despite advances in healthcare technologies in some parts of the world, globally an estimated 80% of maternal deaths are thought to be from preventable causes. A global commitment to the prevention of these tragedies has been affirmed with the signing of the United Nations Millennium Declaration by 189 heads of state. The Millennium Development Goal 5 (MDG 5) within this declaration is a commitment to achieving a 75% reduction in the maternal mortality ratio, from 1990 levels, by 2015. This review will outline some of the terminology used to describe maternal mortality, the aetiologies of maternal mortality and summarise some barriers to achieving the MDG 5.

Charlotte Oyston MB ChB BMedSci(Hons) DipOMG Clinical Research Fellow, The Liggins Institute, University of Auckland, Auckland, New Zealand. Conflicts of interest: none declared.

Christian F Rueda-Clausen MD PhD FTOS Postgraduate Clinical Trainee, Department of Medicine, University of Alberta, Canada. Conflicts of interest: none declared.

Philip N Baker FRCOG FMedSci Professor of Maternal and Fetal Health, The Liggins Institute, University of Auckland, Auckland, New Zealand, and Research Professor, Keele University, UK. Conflicts of interest: none declared.

Definitions

Measurement of maternal mortality is a well-accepted vital statistic that provides a broad diagnostic of the maternal health condition of any given region, as well as the overall effectiveness of health systems. Consistency in the terminology used is crucial when discussing the global burden of and trends in maternal mortality. In the International Statistical Classification of Diseases and Related health Problems 10th edition (ICD-10), the World Health Organisation defines maternal mortality as:

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.

Deaths are further classified as either direct or indirect. Direct maternal deaths are those resulting from obstetric complications (e.g. postpartum haemorrhage), interventions (e.g. anaesthetic complications), omissions or incorrect treatment. Indirect maternal death refers to deaths not caused by obstetric complications, but by pre-existing conditions which are exacerbated by pregnancy (e.g. heart failure precipitated by pregnancy in the presence of pre-existing aortic stenosis). Other definitions in the ICD-10 include *pregnancy-related death* (maternal death during pregnancy or within 42 days of termination of pregnancy irrespective of cause), and *later maternal death* (death resulting from direct or indirect causes occurring between day 42 and 1 year after termination of pregnancy). These definitions are generally not used in comparing mortality rates between countries, but may be useful in particular circumstances. For example, collecting data on *pregnancy related death* may be important in resource poor countries where accurate information regarding cause of death is not available. Conversely, information on *later maternal deaths* may be more important in resource rich countries, where life sustaining technologies can allow very sick women to live longer than 6 weeks post-delivery (e.g. a woman suffering acute fatty liver of pregnancy who dies following liver transplantation 3 months following pregnancy).

Measures of maternal mortality

Estimates of maternal mortality are influenced by both the chance of a woman being pregnant (i.e. the fertility rate) and the chance of death in a pregnancy. The Maternal Mortality ratio (MMR) takes into consideration both of these attributes and is calculated as

$$\text{MMR} = \frac{\text{number of (direct or indirect) maternal deaths}}{100,000 \text{ live births in the same population over the same time period}}$$

This definition is important, as it is the calculation used for international comparison. In contrast, the maternal mortality rate (MMRate) does not consider the fertility rate, and is calculated as:

$$\text{MM Rate} = \frac{\text{maternal deaths in a population over a given period}}{100,000 \text{ women aged 15–49 years in that population, over the same time period}}$$

Women living in resource poor countries not only have a higher risk of death in pregnancy, but have (on average) many more pregnancies than women in resource rich countries. Consequently, their lifetime risk of death due to pregnancy-related complications is higher. This is accounted for by the lifetime risk (LR) of maternal death, which describes the probability that a 15-year-old woman will eventually die from a pregnancy-related cause.

Limitations in calculating maternal mortality and cause of death

Data used to estimate maternal mortality can be derived from civil registration of births and deaths, household surveys, census data, reproductive-age mortality studies and verbal autopsy (lay respondents are interviewed on the signs and symptoms of the deceased before death). The quality of global statistics on maternal death depends on the use of consistent coding systems, methods available to diagnose cause of death, and the completeness and adequacy of data collection in every country. Global comparisons commonly rely on civil registration data (e.g. cause of death as recorded on a death certificate), however, this information may be lacking in resource poor countries. In a 2011 report by the WHO, only 65 of 181 countries had complete civil registration data which included good attribution of cause of death.

Data was lacking or incomplete in 89 countries, and 27 countries had *no* good-quality data on maternal mortality. While some civil registration systems use the ICD-10 to classify causes of death, the use of this system is not consistent between all countries. Obtaining data where civil registration is incomplete, pregnancy status or cause of death is unknown is especially challenging, and likely to obscure true rates of maternal mortality or causes of maternal mortality especially in resource poor settings. Even in well-resourced countries, relying on civil registration data alone is likely to result in an underestimate of true maternal mortality. In the 2011 report of the Centre for Maternal and Child Enquiries (CMACE), 60% more deaths were ascertained by the enquiry compared to those identified by civil registration alone. Such differences in systems and resources means that care must be taken in drawing comparisons between different countries where data is obtained by different means.

Current estimates of maternal mortality

According to the WHO, in 2010 there were an estimated 287,000 pregnancy-related deaths. This equates to almost 800 pregnancy-related deaths per day, or an MMR of 210 maternal deaths per 100,000 live births. These deaths are not equally distributed throughout the world: women from resource poor countries account for 99% of maternal deaths, with 85% of all deaths occurring in Sub-Saharan Africa and Southern Asia (Figure 1). The MMR is substantially higher in the resource rich compared to the resource poor countries – MMR 240 vs. 16 deaths per

100,000 live births (2011 data) vs. 6.69 in the UK (CMACE 2011). Not surprisingly, lifetime risk of maternal mortality is higher in resource poor compared to resource rich countries (1 in 39 vs. 1 in 3800 for women in sub-Saharan Africa vs. women in resource rich countries). There are also large disparities between different groups of women living in the same country. The most susceptible populations are those with low income or socioeconomic status, women living in rural areas and those who are younger than 15 years old; complications in pregnancy and childbirth are the leading cause of death among adolescent girls in most resource poor countries.

Trends in maternal mortality

Global efforts to reduce pregnancy-related have resulted in some – albeit slow – progress. Between 1990 and 2010, global maternal mortality fell by 47%. Whilst an improvement, this falls short of what will be required to meet the overall aim of MDG 5 – a 75% reduction in maternal mortality – which is unlikely to be achieved by 2015. Data from the WHO estimate that the global MMR has decreased from 422 (358–505) in 1980 to 320 (272–388) in 1990 and subsequently to 210 (170–300) per 100,000 live births in 2010. The global maternal mortality ratio declined by only 3.1% per year, an annual decline of 5.5% is required to achieve the MDGs. In the UK, CMACE reported a small decline in maternal mortality in the 2006–09 triennium, as compared to previous years. In particular, there was a narrowing of the gap in pregnancy outcomes between those of low and high socioeconomic status. While these improvements suggest that some of more vulnerable women have enjoyed improved access to quality care in the UK, this trend should not encourage complacency. It is disappointing and frustrating that many of the women who died over this period were considered to have received substandard care, and that even in the resource rich countries, women still die from preventable deaths.

The aetiologies of maternal mortality

In 2010, the WHO reported the leading causes of maternal death (% of all maternal deaths) as:

- haemorrhage – 35%
- pre-eclampsia/eclampsia – 18%
- sepsis – 8%
- unsafe abortion – 9%
- indirect causes – including AIDS, malaria – 18%

In contrast, the leading causes of maternal death in the UK (2006–2008) were:

- indirect causes (including cardiac, neurologic, psychiatric and other causes) – 59%
- sepsis – 10%
- pre-eclampsia/eclampsia – 7%
- venous thromboembolism 7%

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