Current challenges in pregnancy-related mortality

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Abstract

Pregnancy is a normal, healthy state that most women are desirous for at some point in their lives. This physiological, life-affirming process, however, carries serious risks of death and disability (for both mother and offspring), and has tremendous implications for families, communities and economies worldwide. The alarming pregnancy-related mortality rates (particularly in developing countries) are repeated so often that they cease to cause surprise. Despite the fact that 80% of all maternal deaths are preventable, the promise to reduce maternal deaths by 75% before 2015 is still a distant target with little progress made in the past 10 years. Identification of the key challenges in understanding, managing and reducing maternal mortality needs to be prioritized and promoted among different members of the healthcare community, including care providers, researchers and policy makers.

Keywords bleeding; death; developing countries; goals; high blood pressure; infections; maternal; mortality; obstructed labour; perinatal; pre-eclampsia; unsafe abortion

Definition

Maternal mortality, which is also known as maternal death, is the death of a woman while pregnant or within 42 days of termination of pregnancy, regardless of the duration of pregnancy, from any cause related to or aggravated by the pregnancy or its management. In order to prevent confusion and differentiate pregnancy-related causes of death from those coincidental causes of mortality (i.e. accidental or incidental causes), the term "Pregnancy-related death" has been proposed, however, no consensus has been reached in that regard. Furthermore, some authors recognize that pregnancy-related mortality can be sub-classified as direct mortality, which refer to casualties related to obstetric complications (such as postpartum haemorrhage or pre-eclampsia) or other complications (such as mortality due to anaesthetic) or indirect mortality, which refers to maternal deaths attributable to the pregnancy induced exacerbation of pre-existing pathological conditions (such as diabetes or heart failure). Additionally, some authors also consider a group of late maternal mortality, which includes maternal deaths occurring between day 42 and 1 year after birth, however, this last category is very problematic and has not been included within the international definitions.

Measurement of maternal mortality constitutes a very well accepted vital statistic that is easy to measure; it provides a broad diagnostic of the maternal health condition of any given region. 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 pregnancy-related causes, there are an average of 16.5 cases of significant maternal illness or disability related to pregnancy.

Epidemiology

Maternal mortality is still unacceptably high. About 1000 pregnancy-related deaths occur around the world every day. A recent study suggested that during 2008 alone, 342,900 (uncertainty interval 302,100—394,300) deaths were attributable to pregnancy-related conditions worldwide. Remarkably, over 99% of the women affected live and die in developing countries where the mortality ratio is substantially higher that in developed societies (290 vs. 14 per 100,000 births). Indeed, more than 50% of all pregnancy-related deaths during 2008 occurred in only six countries (India, Nigeria, Pakistan, Afghanistan, Ethiopia, and the Democratic Republic of the Congo) (Figure 1). In addition to the well described problem of accessibility that pertains in developing countries, women living in these areas have on average many more pregnancies than women in developed countries (Figure 1), and consequently their lifetime risk of death due to pregnancy-related complications is higher. A woman's lifetime risk of maternal death (which is calculated as the probability that a 15-year-old woman will eventually die from a maternal cause) is 1 in 4300 in developed countries, versus 1 in 120 in developing countries.

There are also large disparities in terms of pregnancy-related mortalities within countries, where the more susceptible populations are women with low income or socioeconomic status, living in rural areas and/or younger than 15 years old. Complications in pregnancy and childbirth are the leading cause of death among adolescent girls in most developing countries.

Global efforts to reduce pregnancy-related mortality in the last decades have had some positive results. Epidemiological data suggest that the global maternal mortality rates have decreased from 422 (358—505) in 1980 to 320 (272—388) in 1990 and subsequently 251 (221—289) per 100,000 live births in 2008. This progress, however, is notoriously heterogeneous and still well below the targets proposed by the international community for the Millennium Development Goals (MDGs), all the nations committed to reduce maternal mortality by 75% between 1990 and 2015. Since 1990, pregnancy-related mortality has only dropped by 34% worldwide. Moreover, between 1990 and 2008, the global maternal mortality ratio declined by only 2.3% per

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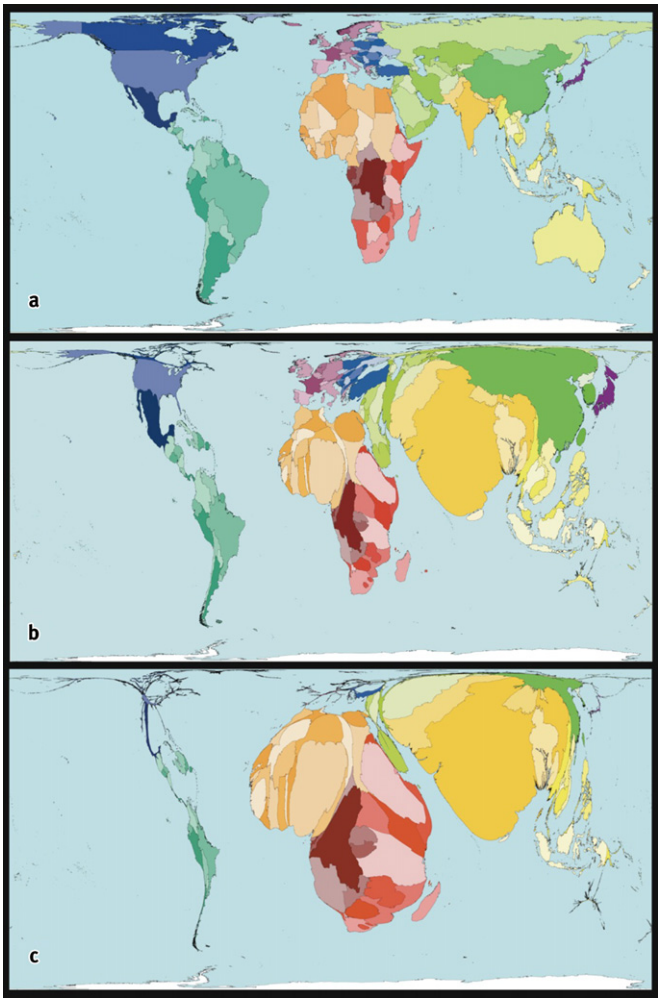

Figure 1 In panel **a**, the size of each country represents the land area, in panel **b**, the size of each country represents the proportion of the world's total births in that territory and in panel **c** the size of each country represents the proportion of pregnancy-related deaths worldwide that occur in that country. Mortality causes considered for this panel include deaths attributable to postpartum haemorrhage, infection, pregnancy induced hypertensive disorders, obstructed labour, conditions due to abortions and miscarriages and other conditions related to pregnancy, labour or immediately after. Different colors were randomly selected to facilitate differentiation of the countries. ©Copyright SASI Group (University of Sheffield) http://www.worldmapper.org/.

year, as compared to an annual decline of 5.5% required to achieve the MDGs.

Aetiology

Most common pregnancy-related complications leading to maternal mortality develop during pregnancy, while a relatively small proportion of these pathologies may exist before pregnancy but are worsened during gestation. The most common pregnancy complications, which account for 80% of all maternal deaths, include postpartum haemorrhage, infections, pregnancy induced hypertensive disorders, obstructed labour and unsafe abortion. The remainder are caused by diseases such as malaria, anemia and HIV/AIDS during pregnancy (Figure 2).

Postpartum haemorrhage (PPH)

Despite the efforts to unify concepts, important variability in the criteria used to define PPH still remains. According to the ICD-9/ICD-10 codes, PPH can be classified based on its aetiology at onset as: postpartum haemorrhage due to retained placenta, also known as third stage haemorrhage (666.0/O720), uterine atony resulting in postpartum haemorrhage, which normally occurs within the first 24 h following delivery of placenta (666.1/O721), delayed and secondary postpartum haemorrhage, which is more common after the first 24 h following delivery (666.2/O722) and postpartum haemorrhage due to coagulation defects (666.3/O723). The criteria to identify a clinically significant lost of blood during/after parturition are still unclear and vary from one region to another. Generally speaking, PPH can be clinically classified as primary or secondary; primary PPH is the more common and is defined as the loss of 500 ml or more of blood within 24 h of the birth of a baby. Primary PPH can be minor (500–1000 ml) or major (>1000 ml). Major primary PPH can further be divided into moderate (1000–2000 ml) or severe (>2000 ml). Secondary PPH is defined as abnormal or excessive bleeding from the birth canal between 24 h and 12 weeks after birth. The minimum blood loss required to be considered excessive or abnormal, however, is not clearly defined. In addition to the imprecision of the definitions used, visual estimates of blood loss are frequently inaccurate and constitute one of the biggest pitfalls in diagnosing PPH. To address this issue, some authors suggest that parameters such as a requirement to transfuse blood after parturition or a postpartum decrease >10% in baseline haematocrit should also be used as a criterion for PPH, regardless of the estimated blood loss.

Relative to other causes of pregnancy-related mortality, PPH is highly relevant in developed countries. For example, between 2003 and 2005, PPH was the third highest direct cause of maternal death in the UK (6.6 deaths/million maternities); 58% of the maternal deaths attributable to PPH were classified as preventable. Recent epidemiological reports have suggested that in developed countries, the incidence of PPH has increased over the last decades. The reasons for the observed trend in these countries are not completely clear, however, changes in the prevalence of some factors associated to PPH such as increased maternal age, obesity, caesarean delivery, abnormal placentation, induction of labour, increased labour duration and multiple pregnancy could be involved.

Infections and HIV-AIDS

For the purposes of discussing global maternal mortality due to infectious causes, maternal deaths are most easily classified as being either attributable to HIV (ICD codes B20-24, Z21 and R75) or other infectious causes. The reason for this distinction, as discussed below, is that HIV represents a significant cause of maternal mortality in Africa. The ICD classification scheme further subdivides the non-HIV related infectious diseases into four groups: i) infectious diseases such as influenza, which have their own separate classification but are complicating the pregnancy in some way (ICD code 098 plus the specific disease identifier), ii) obstetrical tetanus (A34) iii) puerperal infections (086) and iv) puerperal sepsis (085).

The consideration of HIV related maternal mortality separate from other infectious causes is significant because it reflects the huge burden of illness that this disease places on the African continent. The contribution to maternal mortality rate (MMR)

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