1. Introduction

Maternal mortality constitutes a major problem in the context of women’s health. According to the World Health Organization (WHO), over 20% of all healthy life years lost in women of childbearing age are due to 3 factors: maternal morbidity and mortality, sexually transmitted infections including HIV/AIDS, and gynecological cancer [1]. The maternal mortality ratio (MMR) is an indicator of the development and quality of life of a population, and is associated with social development, coverage and quality of health services, and the ability to practice reproductive rights. MMR is a particularly sensitive indicator of inequality, not only providing information on the risks of pregnancy and reproduction in a country, but also on the health and status of women.

Every pregnancy carries risks for mother and baby. However, the risks are higher in countries where resources are scarce and health services are inaccessible and inadequate. According to WHO health statistics, the largest gap between rich and poor is observed in maternal mortality levels. Low-resource countries account for 99% (284 000) of global maternal deaths (Table 1), the majority of which are in sub-Saharan Africa (162 000) and Southern Asia (83 000). These 2 regions accounted for 85% of the global burden, with sub-Saharan Africa alone accounting for 56%. The MMR in low-resource regions (240) was 15 times higher than in high resource regions (16). Sub-Saharan Africa had the highest MMR, at 500 maternal deaths per 100 000 live births, while Eastern Asia had the lowest among Millennium Development Goal (MDG) low-resource regions, at 37 maternal deaths per 100 000 live births. The MMRs of the remaining MDG low-resource regions in descending order are: Southern Asia (220), Oceania (200), South-eastern Asia (150), Latin America and the Caribbean (80), Northern Africa (78), Western Asia (71), and Caucasus and Central Asia (46). The adult lifetime risk of maternal mortality in women from sub-Saharan Africa was the highest at 1 in 39, in contrast to 1 in 130 in Oceania, 1 in 160 in Southern Asia, 1 in 290 in South-eastern Asia, and 1 in 3800 among women in high-resource countries [2].

2. Millennium Development Goals: a dream

In 2000, world leaders signed the Millennium Declaration at the United Nations, from which the MDGs were developed. The aim of these goals is to improve the social and health conditions of the poorest countries, including unifying various countries and organizations that seek to improve socioeconomic and health aspects of the population at risk. Secretary-General Kofi Annan stated: “We will have time to reach the Goals—worldwide and in most, or even all, individual countries—but only if we break with business as usual. We cannot win overnight. Success will require sustained action across the entire decade between now and the deadline. It takes time to train the teachers, nurses and engineers; to build the roads, schools and hospitals, to grow the small and large businesses able to create the jobs and income needed. So we must start now. And we must more than double global development assistance over the next few years. Nothing less will help to achieve the Goals” [3].

One of the aims of MDG 5 is to reduce the MMR worldwide by 75% between 1990 and 2015, utilizing the proportion of births assisted by
Table 1
Estimates of maternal mortality ratio (MMR, maternal deaths per 100,000 live births), number of maternal deaths, and lifetime risk by United Nations Millennium Development Goal region, 2010.

<table>
<thead>
<tr>
<th>Region</th>
<th>MMR</th>
<th>Range of MMR uncertainty</th>
<th>Number of maternal deaths</th>
<th>Lifetime risk of maternal death, 1 in:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lower estimate</td>
<td>Upper estimate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>World</td>
<td>210</td>
<td>170</td>
<td>300</td>
<td>287,000</td>
</tr>
<tr>
<td>Developed regions</td>
<td>16</td>
<td>14</td>
<td>18</td>
<td>2200</td>
</tr>
<tr>
<td>Developing regions</td>
<td>240</td>
<td>190</td>
<td>330</td>
<td>284,000</td>
</tr>
<tr>
<td>Northern Africa</td>
<td>78</td>
<td>52</td>
<td>120</td>
<td>2800</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>500</td>
<td>400</td>
<td>750</td>
<td>162,000</td>
</tr>
<tr>
<td>Eastern Asia</td>
<td>37</td>
<td>24</td>
<td>58</td>
<td>6400</td>
</tr>
<tr>
<td>Eastern Asia excluding China</td>
<td>45</td>
<td>27</td>
<td>85</td>
<td>400</td>
</tr>
<tr>
<td>Southern Africa</td>
<td>220</td>
<td>150</td>
<td>310</td>
<td>83,000</td>
</tr>
<tr>
<td>Southern Asia excluding India</td>
<td>240</td>
<td>160</td>
<td>380</td>
<td>28,000</td>
</tr>
<tr>
<td>South-eastern Asia</td>
<td>150</td>
<td>100</td>
<td>220</td>
<td>17,000</td>
</tr>
<tr>
<td>Western Asia</td>
<td>71</td>
<td>48</td>
<td>110</td>
<td>3500</td>
</tr>
<tr>
<td>Caucasus and Central Asia</td>
<td>46</td>
<td>37</td>
<td>32</td>
<td>750</td>
</tr>
<tr>
<td>Latin America and the Caribbean</td>
<td>80</td>
<td>68</td>
<td>99</td>
<td>8800</td>
</tr>
<tr>
<td>Latin America</td>
<td>72</td>
<td>61</td>
<td>88</td>
<td>7400</td>
</tr>
<tr>
<td>Caribbean</td>
<td>190</td>
<td>140</td>
<td>290</td>
<td>1400</td>
</tr>
<tr>
<td>Oceania</td>
<td>200</td>
<td>98</td>
<td>430</td>
<td>520</td>
</tr>
</tbody>
</table>

Reproduced, with the permission of the publisher, from: WHO et al. [2], p.19. See original publication for footnotes: http://whqlibdoc.who.int/publications/2012/9789241503631_eng.pdf?ua=1.

skilled health personnel as an indicator of progress. Another goal of MDG 5 is to achieve universal access to women’s reproductive health services, based on indicators such as the contraceptive prevalence rate and unmet need for family planning. The 8 MDGs also cover important areas such as the reduction of child mortality; social development issues, which include the alleviation of poverty; primary education; empowerment of women; tackling HIV/AIDS and malaria; as well as environmental issues and working in partnership to achieve the Goals [4].

The MDG process established a series of strategies including targets and indicators to monitor the extent and degree of compliance. Unfortunately, in 2008, it was observed that the targets set for 2015 with regard to maternal and neonatal health would probably not be achieved. The UN Secretary-General’s “Global Strategy for Women’s and Children’s Health” was introduced in 2010 to energize the international community to provide more resources to achieve MDGs 4 and 5 [5,6]. The actual results in certain areas were far from desirable: mortality in sub-Saharan Africa, for example, was 26 times higher than that in European countries and in some others, such as Mali and Haiti, reaching incomprehensibly high levels (more than 1200)—far from the 75% decline set as a goal. However, some countries had made apparent improvements (Fig. 1) [7,8].

Data from WHO suggest that the total number of maternal deaths decreased from 543,000 in 1990 to 287,000 in 2010 (Table 2). Likewise, global MMR declined from 400 maternal deaths per 100,000 live births in 1990 to 210 in 2010. The latter represents an average annual decline of 3.1%.

All MDG regions experienced a decline in MMR between 1990 and 2010, with the highest reduction in the 20-year period in Eastern Asia (69%), followed by Northern Africa (66%), Southern Asia (64%), sub-Saharan Africa (41%), Latin America and the Caribbean (41%), Oceania (38%), and finally Caucasus and Central Asia (35%). Although this last region experienced the lowest decline, its already low MMR of 71 maternal deaths per 100,000 live births in 1990 made it more challenging to achieve the same decline as a region with a higher MMR in 1990.

Fig. 1. Trends in maternal mortality in Thailand; Malaysia; Sri Lanka; and Matlab, Bangladesh. Reprinted, with permission from Elsevier, from Ronsman and Graham [17].
When interpreting change in the MMR, one should take into consideration that it is easier to reduce MMR when levels are high than when they are low. It should be noted that over 50% of all maternal deaths occurred in only 6 countries in 2008 (India, Nigeria, Pakistan, Afghanistan, Ethiopia, and the Democratic Republic of Congo). Among those who do not die, 300 million women are currently living with health problems and disabilities caused by complications of pregnancy and childbirth [9].

Some important determinants of maternal mortality are improving; for example, the total fertility rate, which dropped from 3.70 in 1980 to 3.26 in 1990 and 2.56 in 2008. Similarly, per capita income, which can influence maternal mortality, has risen—particularly in Asia and Latin America—although it should be acknowledged that this factor is not uniform in all regions. A further positive aspect is that the education level of mothers has been rising; for example, the average years of schooling for women aged 25–44 years in sub-Saharan Africa increased from 1.5 in 1980 to 4.4 in 2008. Nevertheless, it could have been higher.

3. Good and bad news

Recent data show that worldwide mortality declined at 1.9% per year on average from 1990—2011, dropping from 409 053 (382 910–437 860) in 1990 to 273 465 (256 332–291 693) in 2011 [10]. The subset of maternal deaths due to direct and indirect obstetric causes declined steadily at an annual pace of 2.8% from 1990—2011 from 392 900 to 217 400. Over the same period, the number of HIV-related deaths during pregnancy rose to a peak of 80 500 in 2003, and through the scale-up of antiretroviral drugs and the natural epidemic curve for HIV, declined to 56 100 in 2011. From 2005—2011, maternal deaths declined by 73 700. Of this decline, 28.6% (21 100 of 73 700) occurred in India, whereas Ethiopia, Pakistan, Nigeria, Indonesia, China, and Afghanistan accounted for a further 32.1% of the decline (23 600 of 73 700) [10].

Another very significant determinant of mortality is the percentage of mothers who give birth with skilled assistance. It should be noted that the increase is steady, albeit slow, and it can be accepted that the coverage of skilled attendance at delivery may have contributed to the decline in maternal mortality [8]. This factor is one of the most important.

Overall progress toward achieving MDG 5 is seriously behind schedule (Fig. 2) [10–12]. Between 1990 and 2011, the MMR in sub-Saharan Africa remained high, at more than 450 maternal deaths per 100 000 live births. In that region the leading cause of death continues to be postpartum hemorrhage [13]. It is a tragedy that most deaths of women of childbearing age are preventable with basic health measures such as sanitation, clean water supply, immunization, adequate nutrition, prenatal care, professional-care childbirth, and family planning, among others. In low-resource countries, many women and children have no access to health services for geographical, economic, or cultural reasons—further accentuating the differences in equality. Furthermore, these facts are concomitant with a limited response capacity and low cultural adaptation by suppliers, giving rise—for example—to the small proportion of births assisted by qualified personnel in these countries.

Other health and nutritional problems are also prevalent. Nearly 500 million women suffer from anemia and the incidence of pregnancies in adolescents is high. The stakes are raised when more than 3 pregnancies occur in women under the age of 18 years with an interval of less than 24 months—a situation aggravated by poverty and discrimination. Thus, maternal mortality is not just an isolated incident, but the culmination of a process [14,15].

The major direct causes of maternal death are hemorrhage, pregnancy-induced hypertension, infection, abortion, and obstructed labor (Fig. 3). Hemorrhage is the leading cause of maternal complications, particularly during delivery, together with postpartum complications that could easily be avoided with immediate attention [13].

4. Maternal mortality and social status

The causes of maternal mortality are also biological, social, and cultural. They range from the status of women and their education and health, to access to services and resolving emergencies. From the biomedical point of view, the major cause appears to be the barrier that exists to accessing health services and the limited ability to solve the problem. History shows that the key to reducing maternal mortality lies not only in social and economic development, but in making an effective treatment available and accessible. It is estimated that a significant proportion of the population in low-resource countries lacks access to health services. This is particularly critical in rural areas and the poorest areas of those countries. The most significant barriers are geographical, economic, and cultural, in addition to the lack of response capacity of services to deal with obstetric or child emergencies and the poor referral system.

The complications that threaten the life of a pregnant woman are the same worldwide. However, the ability to survive these complications varies greatly according to the socioeconomic, cultural, and legal environment of a country and the standards of care. For example, unsafe abortion and obstructed labor account for 13% and 8% respectively of
The 3 delays are: (1) delay in recognizing the risk and need to seek help; and communities to assess the determinants of maternal mortality and countries occur in this period: 78% occur in the first 24–48 hours, difference between the number of women receiving prenatal care and equipment to rural areas are required. However, doctors and obstetricians are not always accessible or culturally accepted. Therefore, midwives have to be relied upon after being properly trained and linked to the health system, which involves monitoring and referral mechanisms for complicated cases.

Postpartum care is also essential since 61% of deaths in low-resource countries occur in this period: 78% occur in the first 24–48 hours, mainly due to hemorrhage, hypertensive disease and, belatedly, sepsis. Mothers, their families, and even many health professionals are unaware of the risks during this period. Vigilance in the first 6–24 hours post partum should be considered a crucial component of delivery care [17].

A major health-related goal in rural areas is to educate the community, including men as husbands and fathers, and opinion leaders, about the preparations for childbirth, complications, warning signs, and even removal of the placenta. It is crucial that local authorities are involved in and understand the magnitude of the problem and the possibilities for their community and health system to prevent maternal deaths, which in turn should strengthen the ties between community health workers and a formal health system. Training in traditional delivery can reduce the risk of infection and also play a pivotal role interculturally. The implementation of measures as described will address the first delay.

For the second delay, 2 steps should be contemplated. The first is beyond the scope of health systems and refers to the construction, repair, and maintenance of roads, especially in rural areas. However, work in the health sector will make authorities aware that improving access in regions of increased maternal mortality is a priority. A further aspect can also be improved: ensuring timely access to a center offering effective management of obstetric emergencies. This begins in the community with the implementation of an alarm system and transport permitting adequate emergency referral.

The appropriateness of health facilities should always be considered important to break down cultural barriers. The intercultural perspective includes the skill and ability to make contact with “others” who have different ways of feeling, thinking, and acting on health—essential factors in countries of ethnic and cultural diversity. Services should incorporate traditional delivery care techniques for those who want them. In this case, deliveries would be assisted by traditional birth attendants, backed by health professionals, who would address any complications. To achieve this, health personnel should be trained and care routines implemented, which involves mobilizing technical and financial resources and political will.

In addition to problems of access to maternal health services, there is also insufficient information about and access to family planning methods, especially by rural women and adolescents [12].

Worldwide, approximately 17 million women under the age of 20 years give birth. A large proportion of teenage pregnancies are unwanted, so the chances of them ending in abortion are higher. Women in this age group account for 10% of abortions performed, most of which are high risk and clandestine. The risk of a teenage mother dying in childbirth is double that of women aged over 20 years, and their offspring are also more vulnerable to health risks.

Approximately 80% of the 42 million abortions performed in the world are conducted in low-resource countries. Of these, around
20 million are performed illegally and unsafely, resulting in the death of an estimated 47 000 women [18]. The proportion of abortions that are unsafe has increased from 44% in 1995 and 47% in 2003, to 49% in 2008 [19]. The differences in mortality between abortions performed in unsafe conditions in low-resource countries and those conducted under lawful practice in high-resource countries are abysmal. This highlights the high risk posed by unsafe abortion in low-resource countries, which is related to the low prevalence of contraceptive use, thereby preventing women from fulfilling their reproductive wishes. Contraception is a method of choice for preventing morbidity and infant and maternal mortality, as well as a right. Although the proportion of women using contraception has risen in recent decades, an unsatisfied demand still exists in low-resource countries for improved access to quality family planning services. An estimated 33 million contraceptive users worldwide are expected to experience accidental pregnancy annually while using contraception. Some of the accidental pregnancies are terminated by induced abortions, and some end up as unplanned births [18]. Indeed, in the last 15 years, there has been a steady decline in economic efforts to enhance and preserve family planning services in low-resource countries.

5. What we can do?

Given this background, is it possible to significantly reduce this problem? The answer is yes, but with great multifactorial effort via a series of combined interventions including, among others: education for all; universal access to health services; nutrition before, during, and after delivery; access to family planning services; professional delivery care and access to quality obstetric services in obstetric emergencies; and policies aimed at raising the economic and social status of women. The only way to achieve this aim is through national commitment to uphold the right to life of women. It is incomprehensible that this—a fundamental human right, ratified by most countries by a number of international agreements on human rights and health, especially reproductive health—is not expressed as a public policy priority to mobilize all sectors and the public at large. Remember the words of FIGO’s past President, Professor Mahmoud Fathalla, who said that maternal mortality is reduced when countries agree that this is worth doing [20]. Several examples support this idea. One is Sri Lanka, where maternal mortality decreased from 555 per 100 000 live births in 1960 to 30 per 100 000 live births in 1990—a period of only 30 years [21,22].
It is currently accepted that in many areas the MDGs will not have been achieved by 2015 and in some countries, if current trends continue, they will not be reached until after 2040 (large parts of Latin America, sub-Saharan Africa, and parts of South Asia). Given these circumstances, the mistakes made to correct and improve the situation need to be revised. The first, perhaps not evaluated primarily, is to discuss the major causes of MMR in depth. Further, is the question of whether it is a realistic goal to achieve MDG 5 by improving obstetric surgical teams in hospitals when cultural, religious, and social conditions that cause destitution in women are strongly male dominated? For example, husbands do not tolerate the interference of health workers; families consider the woman who does not deliver at home as not having the strength to remain the woman of the house; communities do not assume that transport must be a priority in their infrastructure; on occasions, the husband has more influence than the doctor; referrals and hospital transfers are considered unnecessary; and excessive medical health corporatism creates political mafias. These factors pose a block to new generations.

6. Failure to achieve the MDGs

In summary, there are many reasons behind the failure to achieve the MDGs, and the factors are likely to be different in each region. However, 3 may be notable:

1. High-resource countries should be committed to the allocation of 0.7% of their budget to support development in low- and middle-resource countries.

2. Low- and middle-resource countries should increase their budget allocation to health to 15%, as agreed previously by the Abuja Declaration (2001)—in many countries it stands at less than 5%.

Regarding these budget issues, it appears that support for development from high-resource countries is meagre and that 99.3% of health expenses incurred by those countries are mainly from clients’ contributions to their own health, which is often unaffordable [23].

3. The UN system and international foundations working in the field of women’s and children’s health should develop more effective approaches and avail resources needed to improve the situation and ensure sustainability of the programs implemented in low-resource countries.

According to the UN and WHO, maternal mortality is much more than just a health problem. It involves the basic human rights of women not being respected and failure to show the disadvantages and risks to which they are exposed. Maternal health is a concept that involves much more than a reduction in mortality. An additional methodological problem of maternal mortality is the different definitions of it, rendering it difficult to identify the causes and make comparisons. Furthermore, calculation of the size of the problem is complicated by a lack of reliable records.

Maternal death is a tragedy for women, families, and the community. When a woman of childbearing age dies, she often leaves behind small children whose survival is threatened without maternal care, with girls the most vulnerable. The probability of death in these infants is known to be over 100 times that of maternal survival. Since reproductive health in its broadest terms is an important preventive strategy to reduce maternal mortality, public health policies need to be consistent with it, and commit the state to reinforcing and providing all necessary support for them to function appropriately. For maternal mortality, a national commitment is required, whereby the state, civil society, and community strive to acknowledge maternal death not only as a health issue but also as a social injustice.

Conflict of interest

The authors have no conflicts of interest.

References


