

Maternal mortality

Mortalidade materna

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ABSTRACT

Maternal mortality, defined as the death of a woman while pregnant or within 42 days after the end of pregnancy, is a global public health problem. This is an important indicator to analyze women's health, economic development, and social inequalities in a population. The maternal mortality rate in developing countries is alarming, led by the sub-Saharan Africa, which had 500 deaths/100,000 live births in 2012. In the Datasus report, Brazil had 1,719 maternal deaths in 2010 of which 598 occurred in the Northeast. In these countries, the main causes of maternal mortality are post-partum hemorrhage, hypertensive disorders, sepsis, obstructed deliveries, and complications related to unsafe abortion. One of the biggest challenges for the development of policies aimed at reducing maternal mortality is its real magnitude masked by high levels of sub-reported deaths and/or underreported causes of death, especially in developing countries, where three-quarters of all births on the planet occur. Therefore, original reflections were conducted and analysis of how an inadequate verification can influence the health of a population on characteristics of economic development and social inequality of each region based on the available literature on the subject, both in print and electronic versions between 1991 and 2013.

Key words: Women's Health; Pregnancy; Maternal Mortality.

RESUMO

A mortalidade materna, definida como a morte durante a gravidez ou no prazo de 42 dias após o final da gestação, é um problema de saúde pública global. Este é um indicador importante para analisar a saúde das mulheres, o desenvolvimento econômico e as desigualdades sociais em uma população. A taxa de mortalidade materna nos países em desenvolvimento é alarmante, observando-se que na África subsaariana, situava-se em 500 mortes / 100.000 nascidos vivos em 2012. No relatório Datasus, o Brasil tinha 1.719 mortes maternas em 2010, das quais 598 ocorreram no Nordeste. As principais causas de mortalidade materna, em países subdesenvolvidos, são hemorragias pós-parto, distúrbios hipertensivos, sepse, partos obstruídos e complicações relacionadas ao aborto inseguro. Um dos maiores desafios para as diretrizes de desenvolvimento de políticas destinadas a reduzir a mortalidade materna é a sua real magnitude, mascarada por altos níveis de sub-registro de mortes e / ou subnotificação de causas de morte, especialmente em países em desenvolvimento, onde também acontecem cerca de três quartos de todos os nascimentos no planeta. Portanto, com base na literatura disponível sobre o assunto, tanto em versão impressa e eletrônica, usando dados 1991-2013, reflexões originais foram realizadas, bem como análise de como a verificação inadequada pode influenciar na saúde da população, sobre as características de desenvolvimento econômico e da desigualdade social de cada região.

Palavras-chave: Saúde da Mulher; Gravidez; Mortalidade Materna.

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INTRODUCTION

Maternal mortality is still a public health problem in Brazil. It is an excellent indicator of women's health and, indirectly, of the level of health in the general population, in addition, to supporting analysis programs and health care activities.

The current figures reveal an alarming rate when compared to other countries. The death of a pregnant woman during childbirth or in the postpartum period indicates a failure in policy guidelines and health professionals, and therefore, in the society as a whole. Policy guidelines by promoting actions that are not always in accordance with the needs of the population, health professionals by lack of sensitivity and commitment, and society by the established social excluding ways.¹

In developing countries such as Brazil, there are still many difficulties in the process of identifying cases of maternal death due to the inadequate completion of death certificates and large numbers of under-recorded cases.²

LITERATURE REVIEW

Concept and classification

Maternal death is defined by the World Health Organization (WHO) in the 10th revision of the International Classification of Diseases (CID-10) as: death of a woman during pregnancy or within a period of 42 days after termination of pregnancy regardless of the length or location of the pregnancy, due to any cause related to or aggravated by the pregnancy, or by measures taken in relation to it but not due to accidental or incidental causes.

The causes of maternal mortality, as defined by CID-10, are divided into:

- **direct obstetric causes:** resulting from complications of the pregnancy, childbirth, or postpartum period due to interventions, omissions, incorrect treatment, or a chain of events resulting from any of these mentioned causes. The most common causes are hypertensive diseases (including eclampsia, HELLP syndrome), bleeding, and puerperal infection;
- **indirect obstetric causes:** resulting from a previous illness of the mother or developed during pregnancy not due to direct obstetric causes but

aggravated by the physiological effects of pregnancy. The most common causes are diabetes, hypertension, and cardiovascular disease.

Importantly, almost all direct causes are preventable. As for the indirect causes, it is important to note that they are linked to women already suffering from a disease and should, therefore, at first be regarded as a risk pregnancy and followed up with increased care.²

Epidemiology

Each year worldwide, it is estimated that more than 500,000 women die of complications during pregnancy and childbirth. At least seven million women who survive these complications suffer serious health problems, and nearly 50 million suffer adverse health events consequent to childbirth. Most of these diseases and complications occur in developing countries.³

One of the challenges for reducing maternal mortality is to know its real magnitude, which is usually masked by high levels of underreporting of deaths and/or under-recording of causes of death, particularly in developing countries, where about three-quarters of the world's births occur. The WHO establishes the civil registration of all deaths with medical certification of its causes as an appropriate method to measure maternal mortality. However, even in countries with national registration systems, the recommendation for deaths surveillance is maintained for the correct classification of causes and to prevent maternal death underreporting.⁴

In Brazil, the Mortality Information System (SIM), managed by the Ministry of Health, has an estimated coverage of 85% of all deaths nationwide according to demographic data, and with heterogeneous characteristics in different regions of the Federation, with approximately 100% in the Southern and Southeastern regions.⁵

In regions with excellent coverage of deaths, studies show that there are flaws in the system, primarily related to the declaration of death such as maternal causes, configuring underreporting.⁶ Still, the available official data is high, determining the need for corrective actions regardless of whether or not the data is corrected because these are enough indicators that the situation is bad and the prevention maternal morbidity and mortality is needed.⁷

Part of the increase in maternal mortality can be attributed to improved reporting of cases after the

change in the International Classification of Diseases and Related Health Problems in versions 9 to 10 and by the growing number of records associated with pregnancy in death certificates.⁸

In the Millennium Development goals, agreed at the Millennium Summit, two targets were drawn up aiming at improving the health status of women and population: reducing the maternal mortality ratio by three-quarters between 1990 and 2015, and universal access to health specialized in reproduction until 2015.⁹

Among the 40 countries with the highest rates of maternal mortality, the majority is located in the sub-Saharan Africa, with 500 deaths per 100,000 live births. The estimated rates for Latin America revolved around 74.3 maternal deaths per 100,000 live births and in Brazil around 72.3 maternal deaths per 100,000 live births. Countries such as Colombia and Ecuador amount to more than 90 deaths/100,000 live births while developed countries such as Canada and the United States have values respectively of 12 and 21 maternal deaths per 100,000 live births.¹⁰

One-third of all maternal deaths occurs in just two countries: India, with 20% of the total (56,000) and Nigeria with 14% (40,000). Over the past 20 years, the number of maternal deaths decreased approximately 50%, from more than 540,000 deaths in 1990 to less than 290,000 in 2010.¹¹

It is noteworthy that, in developing countries, the main causes of maternal mortality are post-partum hemorrhage, hypertensive disorders, sepsis, obstructed labor, and complications related to clandestine abortions.¹²

During the 80s, a decline in the rate of Brazilian maternal mortality was observed, followed by maintenance of these values between 1988 and 1997 when there was a slight increase mainly due to increased mortality from indirect obstetric causes. This increase, despite the difficulty of registration of these deaths, probably resulted from an improvement in

the quality of information associated with the investigation process on deaths of women of childbearing age through maternal death committees. Another fall in rates was observed between 1999 and 2001, associated with improvement in the quality of obstetric care and family planning.²

In the last WHO report on maternal mortality, Brazil positioned below the millennium goal; in the past 18 years it reached 52% (120/100,000 NV in 1990, 64/100.00 NV in 2005, and 58/100,000 NV in 2008), with an annual average decline rate of 4% when the ideal would be 5.5%.¹³

Brazil is one of 189 countries that in 2000 signed a commitment to comply with the so-called Eight Millennium Development Goals by 2015. Among these, is the reduction of maternal mortality to less than one-third of the levels prevailing in 1990. One of the problems for adequately monitoring this goal is the low reliability of the national health statistics.¹⁴ According to the Maternal Mortality Committees' Manual, there are two hindrances to the proper monitoring of level and trend in maternal mortality: underreporting cases and under-recording causes of death. The first results from incorrect reporting on death certificates, when the cause of death related to pregnancy, childbirth, or the postpartum period is omitted because of ignorance of doctors about the correct completion of the death certificate and its relevance as a source of health data. Under-recording is the omission of filling the death certificate in the registry. This often happens in the Northern, Northeastern, and Midwestern regions due to difficult access to registry offices, existence of irregular cemeteries, or lack of public information on the importance of death certificates as an instrument of citizenship.²

Because maternal death is a sensitive indicator of social inequalities (Table 1), it reflects the degree of economic and social development of each locality.

Table 1 - Distribution of deaths according to causes and region, 2010

Region	Deaths with maternal direct causes	Deaths with maternal indirect causes	Deaths with maternal non-specified causes	Deaths due to pregnancy terminated in abortion	Deaths with maternal causes
Total	1.147 (66.7%)	527 (30.7%)	45 (2.6%)	154 (9%)	1.719
Northern	140 (72.9%)	48 (25%)	4 (2.1%)	15 (7.8%)	192
Northeastern	403 (67.4%)	188 (31.4%)	7 (1.2%)	48 (8%)	598
Southeastern	404 (66.9%)	182 (30.1%)	18 (3%)	73 (12.1%)	604
Southern	114 (59.1%)	65 (33.7%)	14 (7.3%)	8 (4.1%)	193
Midwestern	86 (65.2%)	44 (33.3%)	2 (1.5%)	10 (7.6%)	132

Source: Ministry of Health /SVS - Mortality Information System (SIM).

Therefore, as expected, less developed regions of the country have high female mortality rate due to maternal causes, which is the estimated number of maternal deaths divided by the female population of child-bearing age. The Southeastern and Northeastern regions have the highest number of maternal deaths. Out of the 1,719 maternal deaths reported in 2010, 604 occurred in the Southeastern, 598 in the Northeastern, 192 in the Northern, 193 in the Southern, and 132 in the Midwestern region.¹³

Distribution of causes

The systematic review of causes of maternal death in the world (Figure 1) revealed that bleeding prevailed in Africa and Asia; hypertensive diseases followed by hemorrhage and obstructed labor prevailed in Latin America and the Caribbean. Maternal mortality is strongly associated with the binomial HIV-AIDS in South Africa.¹⁵

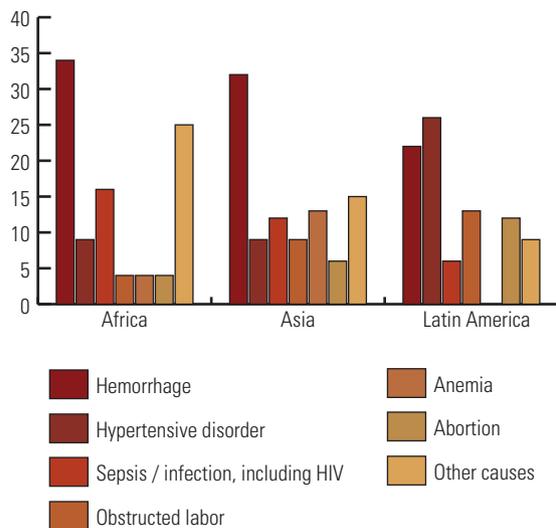


Figure 1 - Maternal death causes, 1997-2002 (percentage). Source: UNITED NATIONS, 2007.

It is important to note that there may be difficulty in recognizing the indirect causes of maternal death in these countries, either by the difficulty in diagnosis and the fact that patients do not make reference to previous diseases or even due to ignorance of these causes.

In many countries, even those that are developed, direct obstetric causes are those that have more weight in maternal deaths. However, the indirect causes, which result from serious diseases that are

associated with pregnancy also have an important influence. In Brazil, the direct obstetric causes account for 66.7% of maternal deaths and their causes are hypertensive disorders, hemorrhagic syndromes, abortion complications, and puerperal infections; all are closely related to socioeconomic factors.¹⁶ Among the direct causes, hypertensive pregnancy disorders and, in particular, pre-eclampsia and eclampsia, are still among the top three causes of maternal mortality and morbidity globally. Preeclampsia also increases the fetal risks and has been associated with an increased risk of stillbirth, neonatal death, intrauterine growth restriction, and premature delivery.¹⁷

Direct obstetric causes are more preventable than indirect causes because they depend on the quality of care during the pregnancy-puerperal cycle.² Hypertensive disorders are the leading cause of maternal death in developed and developing countries.¹⁸

Among the hemorrhagic causes, premature placental detachment characterized as a premature separation of the placenta before birth is one of its main etiologies during the second half of pregnancy, and responsible for complications during pregnancy. Moreover, it is one of the most important causes of maternal morbidity and mortality considering the various aggravating factors of the clinical frame, which includes bleeding, transfusion requirements, conducting emergency hysterectomies, disseminated intravascular coagulation (CIVD), and renal failure.¹⁹

Another major cause of massive bleeding during delivery is placenta previa followed by accreta, which is a condition that increases the risk of maternal and neonatal morbidity and mortality.²⁰ Some risk factors related to this condition are early cesarean delivery, intrauterine surgery, abortion, smoking, twin pregnancy, increased parity, and maternal age.

In discussions on reproductive health and family planning, the access to safe abortion remains a neglected topic and of great controversy. It is estimated that, out of the approximately 43.8 million of annual abortions, 49% are considered illegal. Moreover, almost all (97%) that take place in Africa are illegal.¹²

According to data published in 2012 on global abortion rates, an increase in the number of clandestine abortions from 44% in 1995 to 49% in 2008 was observed.²¹ Despite the overall decline in maternal mortality, mortality rates resulting from clandestine abortions still remain the same - estimated 47,000 per year. In addition, 5 million women still suffer from sequelae related to such abortions. Thus, without ac-

cess to safe and legal abortion, thousands of maternal deaths due to lack of assistance will continue to occur annually.¹²

Socioeconomic characteristics

There are several organic, psychological, social, and welfare factors, closely related to each other, and participants in a chain of events whose fragility is determined by the weakest, which can, therefore, determine the risk and death. Social factors such as age, race, marital status, education, and socioeconomic status are described in several studies demonstrating that there are more vulnerable populations with a higher risk of complications.

Studies report an association between the extremes of age with more complications and maternal deaths. Teenage pregnancy can be generated by ignorance about the risks of early pregnancy, low educational level, or inexperience in finding a job, which may favor early marriage, either by desire or family pressure. This chain of events culminates in pregnancy during the body development phase, associated with first pregnancy complications such as hypertensive disorders and reduced adherence to pre-natal care.²² At the tip of childbearing age, women over 35 years old on first pregnancy have a higher risk of deaths resulting from hypertensive complications.²³ A retrospective study conducted for eight years in the United States show that African-American women have mortality rate four times higher than non-African-American women.²⁴

Similarly, a review of national articles reporting maternal mortality rates according to race/color showed that the rate of maternal mortality is higher among black women. This association may be explained by the great association with hypertensive diseases, poor access to health services, and low quality of assistance.²⁵

On the 8th Confidential Survey on Maternal Death conducted in the United Kingdom, it was found that women with lower economic status showed higher maternal mortality rates. Similarly, a national study in Pernambuco/Brazil revealed that women who did not work showed a high percentage of maternal death. Despite the socioeconomic disparities between countries, poor access to health services and quality of care were the factors that contributed to the deaths evaluated in both localities.^{26,27}

Overall, the studies agree that maternal deaths occur in greater numbers among single women. This

data can mean lack of support for motherhood as a contributor to the deaths and some confusion between marital status and marital living.²³

Women with high-risk pregnancies are 5.3 times more likely to die if not followed-up with pre-natal assistance.²⁸

It is known that a good health system for the reduction of maternal mortality should include effective coverage with wide availability, the accessible cost to all sectors of the population, in addition to quality and safety to ensure a good maternal health care. These are prime targets to be achieved by all health systems considering the problem of infections related to deliveries.²⁹

Different strategies have been used in addressing the serious public health problem that is maternal mortality. For example, since 1996, 90% of pregnant women in Brazil have access to prenatal care, and more than 50% of them attend to more than seven consultations. In addition, almost all deliveries (97%) occur in hospitals.¹⁴

A broad mobilization of professionals, professional societies in the field of health, and civil society organizations have formed multi-institutional and multi-professional committees that express the ideals of participation and provide social control in the Unified Health System.¹⁴

The type of delivery is also one of the factors that contribute to maternal death. Currently, it is known that the cesarean delivery exposes women to the higher risk of death from complications. This increased risk was associated with thromboembolism, puerperal infection, and anesthetic complications.³⁰

The urgent need for medical and nursing schools to review their Obstetrics contents to provide the best quality in training these health professionals and consequent reduction in maternal mortality in the country should also be highlighted. The education of these professionals should not be seen as an isolated process, but as related to the economic and social structure by establishing relationships with other processes more closely with the fields of practice.¹⁶

Currently, the vast majority of the colleges' curricula that prepare health professionals are biocentric with the educational process focused on the disease, technical procedures, and technology. In addition, the environment in which the field teaching activity occurs does not allow a humanitarian practice. It is therefore of great importance that a reformulation of the current model of training of health professionals

take place given the current crisis in the health landscape, both in quantitative and qualitative terms.¹⁶

Other facilitating points of maternal death risk are a birth interval of less than two years, malnutrition, maternal obesity, and late start in prenatal care, i.e., after the 24th gestational week. In addition to these, overcrowding hospitals, poor access to health services, and lack of professional competence in service with delays in diagnosis and consequently adequate treatment contribute to maternal death.²³ The establishment of a reference and counter-reference system linking prenatal care and childbirth and regulating availability of beds in maternity wards could prevent that women in labor have to wander and beg for assistance.³⁰

Tracking and reporting

The Ministry of Health proposed the adoption of the National Pact to Reduce Maternal and Neonatal Mortality that, complying with the principle of equity, incorporates specific actions for black and indigenous women and their newborns. In Latin America, this health pact encouraged the establishment of new maternal death committees since the 90s, with the 23th Pan-American Sanitary Conference.²

The establishment of these committees was identified as one of the strategic actions to improve the death registration system and, consequently, to increase the available quantity and quality of information related to maternal mortality. Thus, states and municipalities can build more effective policies of assistance to women in family planning, during pregnancy, in cases of abortion, childbirth, and puerperium.²

Some “Maternal Death and Prevention Study Committees” in the country only investigate reported maternal deaths (a death certificate that classifies the death as maternal) and highly suspected or alleged deaths (the death certificate does not classify the death as maternal for failure in filling. However, it is presumed as the root cause). In this regard, the Ministry of Health has determined that these committees start to investigate all deaths in 10-49 years old women, whose causes may hide a maternal death.⁵

The committees, by bringing together government and organized civil society institutions with operations in Women’s Health play an important role in social control. Their main goals are the identification of the magnitude of maternal mortality and its causes, factors that determine it, and recommendation of measures

to prevent the occurrence of new deaths. Thus, they constitute an essential tool for the improvement of information on maternal death in order to evaluate the results of assistance provided to pregnant women.²

CONCLUSION

Maternal mortality is still a public health problem in many underdeveloped and developing countries, including Brazil. Failures in policy guidelines, health professionals, and society have contributed to the failure in meeting the millennium goal of reducing maternal mortality by three-quarters in Brazil. That high mortality rate can be prevented with clinical and educational programs that do not require major technologies such as family planning linking prenatal care to childbirth, and sex education. However, government investment and planning on this issue are still not prioritized because the true magnitude of maternal mortality due to high levels of deaths underreporting of and/or under-recording is not known.

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