

# MEASURING MATERNAL MORTALITY IN MALAYSIA

**Hematram Y**

*Department of Community Medicine, International Medical University, 57000 Kuala Lumpur, Malaysia*

**ABSTRACT:** There has been a significant decline in maternal mortality in Malaysia since independence. The issue of measuring maternal mortality accurately is a problem in all countries. Another major problem is whether we can reduce the mortality further. The definition of maternal mortality includes two major components, which are causation of death and the time of death. To improve data collection on maternal deaths, we need to collect all data on maternal deaths, which are omitted or misclassified. Deaths from accidental causes that are not normally used in the calculations of maternal mortality need to be carefully reexamined to be excluded. The time of death means that in maternal mortality calculations, it includes up to six weeks after delivery, but recent World Health Organization (WHO) publication (ICD-10) suggests that the collection of maternal deaths even after six weeks should be reviewed because there are many maternal deaths which occur after six weeks. Measuring maternal mortality rate should be encouraged rather than maternal mortality ratio. Another measurement of maternal mortality is the lifetime risk of the women. The lifetime risk is the measure of maternal mortality that takes into account the probability of becoming pregnant and the probability of dying as a result of pregnancy. Many countries have started reporting the lifetime risk, which is considered to be better indicator to measure maternal health. (*JUMMEC 2006; 9(1): 30-34*)

**KEYWORDS:** Maternal mortality rate, maternal mortality ratio, lifetime risk

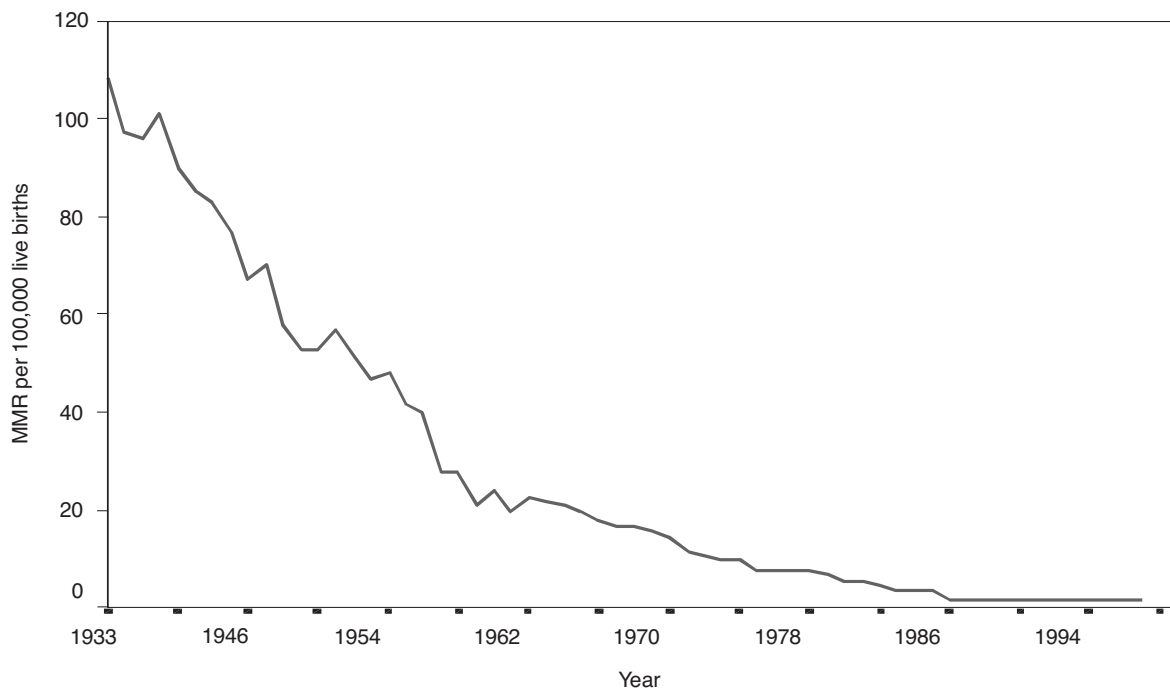
## Introduction

Globally, approximately 210 million women become pregnant and some 130 million give birth. Although most of these pregnancies are uneventful, an estimated 15% develop complications, and about one-third of these have life threatening consequences. Complications related to pregnancy and childbirth result in more than half a million deaths and 99% of them occur in developing countries (1). Every minute somewhere in the world, a woman dies from complications in pregnancy and childbirth. The majority of these deaths are avoidable (2). In some developing countries, the lifetime risk of maternal deaths may be as high as one in seven, when compared to one in 5,000 in many developed countries. This disparity of more than a hundredfold in maternal deaths reflects the tragic status between developed and developing countries (3). Maternal mortality has been a neglected problem globally for so long due to inadequate information. Countries with the highest levels of mortality, seldom have reporting of vital events such as births and deaths. In the mid-1980s, a number of community surveys, many of which were supported by WHO brought to light the size of the problem but the significance of maternal deaths remains largely ignored and unattended.

In Malaysia, the maternal mortality ratio declined from 530 per 100,000 live births in 1957 to 148 per 100,000 in 1970 and 30 per 100,000 live births in 2000 (4). There has been a significant decline in the reduction of maternal mortality in this country in the last 50 years (Figure 1). The decline in maternal mortality has been due to the introduction of various programmes in the area of reproductive health since the 1950s. Have we reached the minimum limit of maternal mortality or can we reduce it further? The answer lies to a large extent in the measurement of maternal mortality. Are we measuring maternal mortality accurately or do we need to relook at the way we measure maternal mortality? There is a probability that if we are able to capture all maternal deaths, Maternal Mortality Ratio (MMR) may be much higher than what it is now. This study proposes to identify the problems of measuring maternal mortality and suggest ways as to how we can further measure MMR more accurately.

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*Correspondence:*  
Professor Dr Hematram Yadav MBBS, MPH, MBA, FAMM  
Department of Community Medicine  
International Medical University  
Komanwel Plaza, Bukit Jalil  
57000 Kuala Lumpur  
Malaysia



Source: Vital Statistics Time Series (1911-1985) Department of Statistics Kuala Lumpur and Ministry of Health, Family Health Unit Annual Report 1998

**Figure 1.** Maternal mortality ratio by year

## Background

Maternal death is defined as the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental cause (5). The direct obstetric deaths resulting from complications arising during pregnancy, labour or during the post-partum period deaths may result from interventions, omissions, incorrect treatment or from a chain of events resulting from any of the above. The indirect obstetric deaths result from previous existing disease or diseases, which develop during pregnancy, e.g., heart disease and diabetes. The accidental or coincidental deaths are deaths due to accidents such as road accidents or drowning of a pregnant women (1).

About 80% of all maternal deaths in the world are due to direct cause which are complications arising during pregnancy, delivery and during the first six weeks after birth. The five main causes of maternal deaths in the world are haemorrhage (25%), sepsis (15%), eclampsia (12%), obstructed labour (8%) unsafe abortion (13%) and indirect causes account for 20% of all deaths (2). Unsafe abortion accounts for more

than a third of maternal deaths in some parts of the world. About 20% of the remaining maternal deaths are due to indirect causes. Anaemia is one of the most significant causes and the other indirect causes are malaria, hepatitis, heart disease and HIV/AIDS. The low status of women limits women's access to economic resources and education. Poor nutrition before and during pregnancy contributes to poor health, obstetric problems and poor pregnancy outcomes for both women and their newborns.

In Malaysia, reports from the Confidential Enquiry into Maternal Deaths (CEMD) during a four-year period of 1991-1994, found that the most common cause of maternal mortality was post-partum haemorrhage (PPH) (24.9%) followed by hypertensive disease of pregnancy (HDP) (16.3%), obstetric embolism (12.4%), and associated medical conditions (10%), birth trauma was 6.4% and puerperal sepsis was 6.1%. The indirect maternal deaths were responsible for 10.5% of the total maternal deaths for the same period (6).

### **Reliability of maternal mortality rates**

Theoretically, maternal mortality rate is the number of maternal deaths (numerator) to the total number of pregnancies (denominator) per 100,000 pregnancies.

However, in practice, it is very difficult to get the exact number of pregnancies. Therefore, what is measured is actually the maternal mortality ratio and not the maternal mortality rate in the comparison of maternal deaths to total births. Maternal mortality rate is difficult to obtain because the denominator of exact number of pregnancies including live births, foetal deaths, stillbirths, induced and spontaneous abortions, ectopic and molar pregnancies are difficult to obtain. Therefore, total births as a proxy denominator for the total number of pregnancies are used.

Maternal Mortality Ratio is also an underestimate due to poor vital registration of maternal deaths. Many deaths go unregistered and uncertified. Although some countries have a good registration system, the poor classification of death makes the validity of the maternal mortality rate questionable.

The MMR measures a woman's chances of dying from a given pregnancy. For example, if a pregnant woman who has a miscarriage during the first 28 weeks, does not register the deaths of the foetus. If she has not registered for pre-natal care, she may be missed in the denominator, thus, affecting the MMR rate. Also pregnancies that result in death of the foetus after 28 weeks are also often not registered. In some underdeveloped countries, the registration of births and death may not be easily available due to poor accessibility and cost of travel to make a report. The mothers also do not regard this issue as important. Pregnancy is also seen as a private matter in some societies and as such terminations and abortions may not be reported. It is very difficult to know the exact number of pregnancies and therefore live births, which is easily available is used as the denominator. Live births are therefore considered a reasonable proxy indicator of pregnancies in an area.

### **Problems in maternal mortality measurement**

There are two problems in the definition; one, that is related to the time of death and the second, to the cause of death. With regard to the time of death, historically MMR was defined as deaths occurring within six weeks of pregnancy. This six weeks timing was sanctioned by a variety of practices both religious and cultural. There is no scientific basis for this six weeks period (7). However in modern day medicine, life can be sustained longer with better procedures and techniques, which can prolong dying and delay death. Even before the era of modern medicine, it is likely that death took place beyond the six weeks interval but the proportion was very small. Medical procedures may increase that proportion but it is likely to remain fairly small although by no means negligible. The Centre for Disease Control and Pre-

vention reported that 29% of maternal deaths occurred after 42 days of pregnancy termination and about 6% occurred 90 days post-partum (7). The ICD-10 therefore, introduced a new category called the "late maternal death, which is defined as death of a woman from direct or indirect obstetric causes more than 42 days but less than one year after termination of pregnancy."

The second problem with the definition of maternal death, lies in the classification of the cause of death. Omission of maternal deaths can be due to the fact that pregnancy and abortion are concealed. There can be also a misclassification of maternal deaths between maternal and non-maternal deaths and also obstetric and incidental deaths. Sometimes, even the cause of death is ill-defined and difficult to categorize. According to ICD-9 and ICD-10, maternal deaths are divided into two groups, i.e., direct obstetric death and indirect obstetric deaths. The drawback of this definition is that the maternal death can escape being classified as being the precise cause of death. Deaths from "accidental or incidental causes" have historically being excluded from maternal mortality. However, in practice, the distinction between incidental and indirect cause of death is difficult to make. It is likely that many homicides and suicides of pregnant women may be classified as accidental or fortuitous but in actual fact, it could be due to the embarrassment of premarital pregnancy or that the pregnancy may have produced a child of the wrong sex. Thus, the suicide or homicide examination has to be done in detail to ascertain that it is excluded in the measurement of MMR (7). Deaths missed due to causation in some countries ranged from 22% in England and Wales to about 70% in Egypt, Jamaica and Puerto Rico (8).

### **Changes related to MMR in ICD-10 (7)**

There is very little change in the definition in the ICD-9 and ICD-10 codes for classifying causes of maternal deaths. The Tenth Revision of International Classification of Diseases (ICD-10) defines MMR similar to the ninth revision. The Ninth International Classification of Diseases (ICD-9) classified the complications of pregnancy, childbirth and the puerperium into five broad classes:

1. Pregnancy with abortive outcome (630-639),
2. Complications related to pregnancy (640-648),
3. Normal delivery and other indications for care in pregnancy, labour and delivery (650-659),
4. Complications occurring mainly in the course of labour and delivery (660-669), and
5. Complications of puerperium (670-676).

However, the Tenth International Classification of Disease (ICD-10) has divided the pregnancy-related problems into eight blocks, covering slightly different group of diseases. They are:

1. Pregnancy with abortive outcome (000-008),
2. Oedema, proteinuria and hypertensive disorders of pregnancy, childbirth and puerperium (010-016),
3. Other maternal disorders predominantly related to pregnancy (020-029),
4. Maternal care related to the foetus and amniotic cavity and possible delivery problems (030-048),
5. Complications of labour and delivery (060-075),
6. Delivery (080-084),
7. Complications predominantly related to the puerperium (085-092), and
8. Other obstetrical complications not elsewhere classified.

There is an increase of three more categories according to ICD-10 as compared to ICD-9 and this will make comparison of data very difficult within the country and also between countries. The ICD reporting system also assumes a single cause of death although there is a chain of events to the final cause of death. Only a single cause of death is reported and the cause is very subjective. There is a possibility that the cause of death may be misclassified. This misclassification may also reduce the maternal mortality further.

## Discussion

Although there has been a significant decline in maternal mortality in Malaysia, the actual rates may be higher. All maternal deaths in all wards in the hospitals need to be reviewed to exclude the possibility of missing maternal deaths. This is to make sure that we do not miss the maternal deaths that have died in medical, surgical or other wards due to direct or indirect causes and have been misclassified. This will provide more accurate MMR in the country. A concerted effort is mandatory to include all maternal deaths that are missed by omission, misclassification of deaths and also deaths that are ill-defined is necessary to avoid any missed deaths. All the incidental or accidental death currently classified, must be confirmed to exclude it as a maternal death. Although the Ministry of Health Confidential Enquiry into Maternal Death (CEMD) does this, it must be clear the accidental maternal deaths are really accidental deaths and only then they can be excluded from the MMR calculations. Careful reviews may mean that some of

the incidental deaths may be included in the MMR calculation. Countries that do not have the registration of births and deaths sometimes use special surveys and other methods to measure maternal mortality.

Malaysia has a good database and it needs to address the issue of missing deaths and take into consideration the new ICD-10 proposal of including those maternal deaths beyond 42 days. In countries where the maternal mortality is high, the bias introduced by the inclusion of accidental or incidental causes is usually low. In rural Bangladesh, where the overall mortality rate is 570 per 100,000 live births, it was found that 90% of the deaths were due to direct and indirect maternal causes. Therefore, the issue of incidental maternal deaths is less (7). However, in Malaysia where the maternal mortality rate is 20 per 100,000 live births and direct and indirect account for 78.5% and incidental deaths account for 21.4%, there is a need to review all accidental deaths more seriously.

To overcome this problem of causation of deaths, the ICD-10 has suggested a new category "the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the cause of death". ICD-10 has also introduced the late maternal death category which is defined as the death of a woman from direct and indirect obstetric cause more than 42 days but less than one year after termination of pregnancy. This is to recognize the cases, which may die due to pregnancy causes after 42 days of birth. We may have missed some of the maternal deaths due to this cause. It was found in the state of Georgia in US, that 29% of maternal deaths occurred after 42 days of pregnancy and 6% occurred after 90 days over the period of 1974-75. We have to look at maternal deaths after 42 days to see whether they are related to maternal deaths.

## Conclusion

With the confusion in the use of the terms ratio and rate, a proposed ideal measure is the lifetime risk. The concept of lifetime risk is another way in which some countries are measuring maternal mortality and it is important that we adopt this concept. This takes into account both the probability of becoming pregnant and the probability of dying as result of pregnancy cumulated across a woman's reproductive years – the lifetime risk. The product of the total fertility rate and the maternal mortality ratio can also approximate it. This concept is becoming increasingly popular in developed countries and we should seriously consider applying this concept in our country. With the imple-

mentation of some of these ideas, we may be able to get a more accurate maternal mortality data and therefore address the problem of inaccurate maternal mortality measurement in the country.

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