PREVENTING MATERNAL DEATHS

Edited by
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CONTRIBUTORS

While the final text of this book is a synthesis of countless experiences and insights, ten people wrote original drafts for individual chapters. The process of moulding the themes into a coherent whole, and the enrichment resulting from the collaboration of so many enthusiastic and knowledgeable individuals, have substantially changed much of the original text—to such an extent that each of the chapters is now the work of several people. For this reason, we have preferred not to attribute individual chapters to those who wrote the first drafts, but simply to list here the contributors:

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Chapter 1

INTRODUCTION

Childbirth is a universally celebrated event, an occasion for dancing, fireworks, flowers or gifts. Yet, for many thousands of women each day, childbirth is experienced not as the joyful event it should be, but as a private hell that may end in death. In practically every society, celebration of life is the dominant theme, while the grimmer side of childbearing is often shrouded in silence, known only to those who suffer it and those who attend them.

In fact, maternal death and injury in developing countries constitute a tragedy of vast proportions. Yet it is a tragedy that has been largely ignored by those who set national and international health priorities, because those who suffer generally live in remote places, are poor, illiterate and politically powerless.

Today the rates of maternal mortality in rich and poor countries show a greater disparity than any other public health indicator—including the infant mortality rate, which is most often taken as the measure of comparative disadvantage. Thus, for a woman in the developing world, the average lifetime risk of dying of a pregnancy-related cause is between one in 15 and one in 50, compared with an average lifetime risk of between one in 4000 and one in 10 000 for a woman in the developed world.

This situation has existed for many years, but because childbearing is essentially a healthy and welcomed process, traditional societies have somehow accepted the risks as normal and unavoidable. It is only very recently that people have started to challenge—loudly and clearly in international forums—the stifling mix of personal fatalism and political disregard for women's needs that has condoned inaction in many poor countries.

Under the spotlight of the United Nations Decade for Women (1976–85), the sheer scale of the suffering associated with maternity became widely recognized. So, too, did the

crucial fact that most of this suffering is preventable, and that Health for All by the Year 2000 is just an empty slogan if glaring inequities in health care provision are allowed to continue.

There are encouraging signs that people are now beginning to build on this new awareness, with practical commitment to maternal health at the national and international levels. It is the purpose of this book to encourage the initiative by pulling together in one place diverse reports and fragments of information on maternal mortality, and thereby to give an overview of current knowledge on this major public health problem.

The book is also intended to be a catalyst for change in public health policy by establishing the special and long-neglected health needs of women as a high priority.

Since the book is intended for a wide range of people concerned with women's health—from the general reader to the specialist seeking particular information on the causes of, and possible solutions to, maternal mortality—it has been necessary to cover both basic and more specialized information. We hope that readers will bear with the material that is not relevant to their personal inquiry.

Of great encouragement is the fact that the concerted international effort to lower the infant mortality rate in poor countries in recent years has been very successful in saving young lives. The same can be achieved in the field of maternal mortality. We have the knowledge to make childbearing safe; success depends now on broad public support and a strengthening of political will.

Chapter 2

MEASURING MATERNAL MORTALITY

Definitions

Maternal death

Intuitively one would expect the definition of a maternal death to be a simple matter. Childbirth is a memorable event and death in childbirth even more so. In practice, however, matters are not so clear cut. If the definition of a maternal death is to include all deaths due to pregnancy and childbirth it must include deaths taking place before childbirth (e.g., due to abortion, ectopic pregnancy), those taking place during childbirth (e.g., due to antepartum, intrapartum or postpartum haemorrhage), as well as deaths taking place some time after the actual event of childbirth (e.g., due to sepsis). Moreover, not all maternal deaths are directly due to conditions resulting solely from pregnancy. Some are caused by pre-existing conditions which are aggravated by pregnancy (e.g., hepatitis). This latter distinction is not new. Traditionally, maternal deaths have been classified as "true" maternal deaths when the pregnancy was directly responsible for the sequence of events that led to the death, and "associated" or "indirect" where the condition that led to the death was unrelated to the pregnancy (*1*). This distinction is reiterated in the Ninth Revision of the International Classification of Diseases (ICD-9), which defines a maternal death as follows (*2*):

> A 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 causes.
>
> Maternal deaths should be subdivided into two groups:
>
> (1) Direct obstetric deaths: those resulting from obstetric complications of the pregnant state (pregnancy, labour and puerperium), from interventions, omissions, incorrect treatment, or from a chain of events resulting from any of the above.

> (2) Indirect obstetric deaths: those resulting from previous existing disease or disease that developed during pregnancy and which was not due to direct obstetric causes, but which was aggravated by physiologic effects of pregnancy.

Implicit in this definition is the notion of exclusion—"a maternal death is the death of a woman while pregnant . . . but *not* from accidental or incidental causes"—which if followed could significantly reduce the bias inherent in most of the maternal mortality rates published today. A working group on health statistics, meeting in Geneva in 1974, preferred to use the following definition of a maternal death: "the death of a woman while pregnant or within 42 days of termination of pregnancy irrespective of the duration of or the site of the pregnancy". The group went on to say: "this should be the total definition. We wish to have included in 'maternal mortality' all known deaths of women known to be pregnant. In this regard all death certificates of women in the reproductive age group, 12–50, should have the certificate specially annotated if the woman was known to be pregnant at the time of her death or was known to have been pregnant at any time within the previous 42 days. Maternal death should then be subdivided into three groups: firstly, direct obstetric death, secondly, indirect obstetric death and, thirdly, the fortuitous or coincidental death of a woman where the condition causing the death was not obstetric and was not aggravated by the obstetric state. It is realized that in many situations it will not be possible to obtain information on all deaths in the three categories but certainly the principles should be maintained."[1] Maternal mortality is thus being defined as a 'time of death' measure, analogous to infant mortality, which can, where such information is available, also be analysed by cause.

The ratio between the three components of maternal mortality thus defined will depend critically on the level of maternal mortality. In countries where the level is low, the inclusion of external causes might render an estimate of maternal mortality less useful for monitoring and planning. Fortunately, these are usually countries with good cause-of-death registration, where the separation into the three components should not pose any insurmountable difficulties. In countries where the maternal mortality rate (MMR) is

[1] *Report of a working group on health statistics in relation to maternal health and perinatal events, Geneva, 12–16 September 1983.* Unpublished WHO document DES/ICD-10/83.10.

high, the bias introduced into estimates of maternal mortality by the inclusion of external causes is usually very low and well worth the overall improvement in the total estimate. In rural Bangladesh (MMR = 570 per 100 000 births) it was found, for example, that 90% of deaths of women who were pregnant, or had been pregnant within the preceding 90 days, were due to maternal causes (*3*). An Egyptian inquiry (MMR = 263 per 100 000 births) found 87% of such deaths to be due to maternal causes (*4*).

Maternal mortality rate

While the number of maternal deaths occurring in a given locality (or country) is a useful measure of magnitude and can be used for the planning of maternal and child health (MCH) services or for the analysis of causes, it cannot be used as an indicator to measure change or to make comparisons between locations. Moreover, the total number of maternal deaths is a function of two variables—fertility, i.e., the probability of becoming pregnant and, once pregnant, the risk of dying from maternal causes. A reduction in either component can effect a reduction in the proportion of women dying from maternal causes. (The enormous differentials in maternal mortality rates in the world thus tell only half the story.)

The maternal mortality rate, the most commonly used indicator of maternal death, measures a woman's chances of dying from a given pregnancy and should, theoretically, relate the number of maternal deaths (as the numerator) to the total number of pregnancies (as the denominator). Ideally, therefore, the numerator should include all deaths defined as "maternal deaths" in a given time interval, and the denominator all episodes of pregnancy occurring in the same time interval, regardless of their outcome.

In practice, however, neither concept can be generally employed. Even in countries with the most advanced and efficient vital registration systems, women whose pregnancy results in a spontaneous abortion any time during the first 28 weeks are not registered and hence are automatically excluded from the population at risk of dying from a maternal death (although they may appear in the numerator if the cause of death is diagnosed as such). Similarly, the recording of pregnancies that result in a late fetal death is often far from complete. As a result, the population at risk of maternal death is generally taken as the number of live births, which

is assumed to be a good proxy indicator of the number of pregnancies. Typically, in countries with low induced abortion rates, the former is within 10% of the latter, which is unlikely to affect markedly the overall rate.

How reliable are official rates?

Most official maternal mortality rates, with the notable exception of hospital rates, are underestimates. The reasons for this will vary according to certification practices, the degree of sophistication of the vital registration system or whether indeed a vital registration system exists at all. The UN estimates that vital registration of death data exists in 69 of the 166 Member States of WHO, covering a total population of 1452 million, or about 30% of the world's population (*5*).

Where good vital registration does exist, the biases are usually due to incorrect classification of the cause of death. There may be many social, religious, emotional or practical reasons for not classifying a maternal death as such. Deaths of unmarried women or those resulting from the complications of abortion, for example, may often be classified under another cause to avoid embarrassing the surviving family; this is all the more likely if the abortion was illegal. The extent of this type of under-reporting can be considerable. Another common cause for under-reporting is a wish to avoid blame.

In most developed countries and in most hospital settings all over the world there is usually an inquiry following a maternal death. It is, therefore, not difficult to imagine that in many cultures this constitutes a strong incentive to attribute a maternal death to a less blameworthy cause. Such misrepresentation may not be very common in countries with a tradition of "no name, no blame" confidential inquiries, but seems to be quite common elsewhere. (In such situations the instigation of a system of confidential inquiries may, in fact, be counterproductive.)

In countries with very low rates of maternal mortality, very few maternal deaths actually take place in obstetric departments of large hospitals because, when life-threatening conditions, such as acute renal failure, arise the patient is usually transferred to another specialist department. If she dies there the death will be certified by a non-obstetric specialist and the cause of death appearing on the certificate

may well not mention the obstetric condition which triggered the fatal sequence of events.

Evidently, even in countries where all or most deaths are medically certified, maternity-related mortality can still be grossly underestimated. A study conducted in the USA by the New Jersey Health Department identified an additional 26 maternal deaths in that State during 1974–75 over and above the 30 deaths reported in the vital statistics (*6*). A study carried out by the Centers for Disease Control found that the incidence of maternal mortality in the USA in 1974–78 was 12.1 per 100 000 live births rather than the reported rate of 9.6 (*7*). Intensive surveillance through a review of death certificates and selected medical records in Puerto Rico in 1978 and 1979 revealed that only about 27% of pregnancy-related deaths had been recorded through the registration system.[1] By linking death certificates of women in the childbearing ages with birth certificates of their offspring, researchers reported a 50% increase in the number of known maternal deaths in Georgia in 1975 and 1976 compared with the figure obtained from vital registration (*8*).

It is clear that even in the most favourable circumstances, as in developed countries, and certainly in the far less favourable circumstances of most of the developing world, special efforts have to be made—and additional costs incurred—in order to get good data on maternal mortality. Whether the additional costs and efforts are worth while will depend on the uses to which the data are put. In general, the more precise the information the greater the cost, and it may well be that in order to plan and implement interventions aimed at improving women's health a broad order of magnitude suffices.

Moreover, in most developed countries, a maternal death is a very rare event and is no longer a good indicator of the risks to women's health that result from their reproductive functions. A more holistic view of the reproductive health of women in these circumstances must include the risks that women run in order *not* to get pregnant, i.e., the risks of death resulting from contraceptive use. This notion has given rise to the development of what is called the *reproductive mortality rate* which includes not only pregnancy-related

[1] *Methodology for intensive surveillance of pregnancy-related deaths, Puerto Rico, 1978–1979*. Unpublished document of United States Department of Health, Education and Welfare, Center for Disease Control, Atlanta, GA.

deaths but also deaths from the side-effects of contraceptive methods. The latter can be estimated from data on the prevalence of oral contraception, use of intrauterine devices (IUDs) and sterilization, and from estimates of mortality risk associated with their use derived from epidemiological studies. An appropriate denominator in this case for approximating the person-years of exposure to risk would be the number of sexually active women in the reproductive age group. As this figure is not generally available, the total number of women in this age group is used instead. Whereas in 1955, 99% of the reproductive deaths in the United States were pregnancy-related, only slightly more than one-half (53%) were so in 1975. Virtually all of the remainder (45%) were related to oral contraceptive use (*9*). By way of contrast, in Menoufia, Egypt, in 1981–83 and in Bali, Indonesia, in 1980–82, 98% of reproductive mortality was pregnancy-related (*10*).

Intermediate between countries with good vital registration and those where there is incomplete or no coverage[1] of registration, there are many countries where the registration of deaths is fairly complete but registration of the cause of death is poor. Maternal mortality rates based on data derived from such systems can be extremely misleading. An indication of the degree of incompleteness of cause-of-death certification can be gleaned from the number of deaths classified as being due to "symptoms and ill-defined causes". In Thailand, for example, out of the 18 985 deaths of women aged 15–44 years registered in 1981, 863, or 5%, were registered as being from maternal causes, giving a maternal mortality rate of 81.2 per 100 000 births. However, an additional 6061 women, or 32%, died from "symptoms and ill-defined causes". Bearing in mind the problems of definition described above, one can safely guess that at least an equivalent proportion (i.e., at least 5% of 6061, or 300) also died from maternal causes, bringing the maternal mortality rate up to at least 109 per 100 000 births. If *all* the 6061 deaths from ill-defined causes were maternal, the maternal mortality rate would be 651, which is clearly an overestimate but is indicative of the degree of confidence that the "official" maternal mortality rate can inspire. As can be seen from Table 2.1, Thailand is far from being unique in this respect—in some countries as many as 63% of women's deaths are without specified cause.

[1] *Coverage*—the extent to which all population segments or subgroups are included in the registration system within a country; *completeness*—the extent to which all relevant events are counted.