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STUDYING MATERNAL MORTALITY IN DEVELOPING COUNTRIES

RATES AND CAUSES

A GUIDEBOOK



WORLD HEALTH ORGANIZATION
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 A GUIDEBOOK
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INTRODUCTION

In recent years there has been a substantial increase in concern over the persistent high levels of maternal mortality in developing countries. This concern led to the International Safe Motherhood Conference held in Nairobi in February 1987, which was sponsored by the World Health Organization, the World Bank and the United Nations' Fund for Population Activities. This landmark conference was attended by representatives of 37 countries, 14 non-governmental organizations, and seven bilateral aid organizations.

At the Conference, Dr Halfdan Mahler, Director General of the WHO, pointed out that one of the reasons for growing attention to this neglected problem is the accumulation of reliable data showing very high levels of maternal death in a number of developing countries. He noted, however, that "most of the countries where maternal mortality is high are also countries where even registration of deaths, let alone certification of cause of death, is greatly deficient or absent."

The aim of this book is to assist people in such countries to gather information on the level and causes of maternal deaths in their area. This book is not written for professional researchers. It is designed to be used by anyone who wants to find out more about the nature of this problem in their area, be they physicians, nurses, administrators, social workers, or planners.

The structure of this book reflects the process that these people may go through. The first step is to decide whether research of the kinds covered in this book is needed in a given situation (Chapter 1). If it is, then the next step is to decide what questions the proposed study should answer (Chapter 2). This decision leads to the choice of study design and sources of information to be used (Chapters 3 and 4). Chapters 5-7 provide practical information on planning, setting up, and managing the study. This information is drawn from the experiences of researchers who did studies of maternal mortality in Bali, Bangladesh, Egypt, Ethiopia, India, Jamaica and Tanzania. (See Appendix A for a list of contributors.) Throughout this book, these studies are used as examples. (In addition, some of the data collection forms and other instruments used in these studies are included in Appendix D, so that readers can study, use or adapt them.) Finally, Chapter 8 discusses ways to put the study findings to work preventing future unnecessary maternal deaths.

Having said what purposes this book is intended to serve, it is important to note what it is not intended to do. This book does not cover methods (e.g., "operations research" or surveillance) for evaluating preventive programmes. Nor does it cover studies of maternal morbidity. It is hoped that publications on these issues will become available within the next few years.

As this is the first edition of the guidebook we are very anxious to know whether it has proved useful. If you have comments or suggestions for additions or improvements please write to: Division of Family Health, World Health Organization, 1211 Geneva 27, Switzerland. Thank you.

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1. IS RESEARCH NEEDED?

This book discusses the methods for determining rates of maternal death and identifying the reasons why women die. Some of the methods described are relatively simple, while others are more costly and difficult. However, to do any formal study requires time, energy and often money. Therefore it is important to consider carefully at the outset whether a formal research project is needed. Answers to many questions can be found either by studying the literature, or by relatively informal observation. For example, in a hospital with a large number of maternal deaths it may be obvious that lack of supplies and staff are important contributing factors. It might be possible for the medical director, or other staff, to improve the situation without taking the time to do a study. On the other hand, having data that demonstrate the problem may help convince the government or other agencies to take appropriate action.

In order to decide whether more research is needed, it is essential to be clear about what use you intend to make of the information. Do you want to convince the government or health professionals in your country that maternal mortality is an important problem so that preventive programmes receive more attention? Do you want to find out whether the medical care in your hospital is failing to prevent maternal deaths so that you can improve services? Do you want to know about cultural factors in maternal deaths so that you can design a health education campaign? Do you want to know about problems of access so you can organize transport? Each of these objectives requires a different kind of information.

It is important to find out whether the information you need is already available. Compared to some other areas of public health (e.g. infant mortality), there have been relatively few good studies done on maternal mortality.

In most developing countries there is not good information on rates of maternal mortality. National statistics are based on routine reporting or hospital studies, which are not adequate sources of information on maternal mortality. (This is more fully discussed in later sections.)

As for the reasons why women die, there is a good deal of information on the medical diagnoses of maternal deaths. In developing countries the five major obstetric causes of maternal deaths are haemorrhage, infection, toxæmia, obstructed labour, and illicit induced abortion. In some countries, endemic diseases such as malaria and hepatitis contribute to a substantial proportion of maternal deaths.

A good deal is also known about the influence of maternal age and parity on maternal mortality. In general, women at either end of the age and parity continuums are at greatest risk of death - i.e., women younger than 18; women 35 or older; women having their first birth and those having their fourth or later birth.

There are also some studies which show that inadequate medical supplies and treatment result in death from pregnancy complications of many women who could have been saved (e.g. the studies in Jamaica and Tanzania).

There is, however, very little information on other factors that contribute to maternal deaths, such as women's access to medical care and family planning services, and sociocultural factors. For example, if two women have postpartum haemorrhages, and it takes one woman half an hour to get to the hospital and it takes the other woman five hours, the second woman is more likely to die. Unfortunately, research on this kind of factor is only beginning.

It is not necessary to spend a great deal of time in order to find out what is already known. See Appendix C for information on how to get copies of reviews and studies. In addition to reviewing the published literature, it is a good idea to talk to other people in your country about what information exists. For example, there may be unpublished reports or doctoral dissertations that contain useful data.

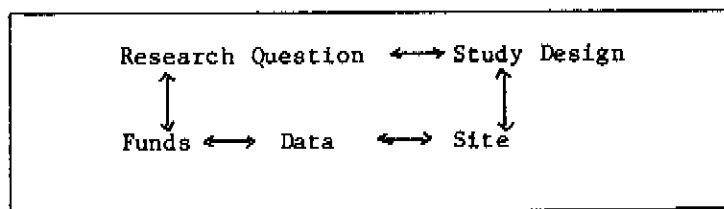
2. WHAT DO YOU WANT TO KNOW?

If you decide that more research is needed, the next step is to formulate the study question, (the "what do we want to know?").

While, in theory, a study begins with the question, this is not always the case. Some other aspect of the study, such as the site, may already have been determined. If, for example, the study is going to be conducted in a hospital, this influences the questions that can be addressed. Similarly, if the amount of time and money available is very limited, this will also affect the options open to research. Therefore, it is often necessary to adapt various aspects of the study to fit existing constraints.

In practice, then, there is a reciprocal relationship among various aspects of the study, as the diagram below suggests:

Figure 1.



Research questions about maternal mortality generally fall into two categories: How big is the problem? What factors contribute to maternal deaths?

2.1. How big is the problem?

Because most developing countries lack good studies on maternal mortality, the importance of this public health problem is generally not appreciated. Research on the magnitude of maternal mortality is useful for convincing policymakers that it deserves attention.

The magnitude of maternal mortality is measured in two ways: the number of deaths and the frequency of deaths.

2.1.1. How many deaths are there?

We begin with the number of maternal deaths for several reasons. Firstly, it can be a valuable initial indicator of the size of the problem. Secondly, the number of maternal deaths forms the basis for all other measures of the size of the problem - e.g., the numerator of the maternal mortality rate.

2.1.2. How common are maternal deaths?

Part of the process of formulating the study question is making it more specific. For example, the heading of this section, "How common are maternal deaths?" is too general to be a good study question. It needs to be made more specific, because the frequency of maternal deaths can be expressed in various ways, depending on the choice of denominators. If the denominator is live births, the study will answer different questions than if the denominator is women of reproductive age.

The denominators most often used in studies of maternal mortality are described below under the questions they address:

"How dangerous is pregnancy in this area?" This question is addressed by using live births as the denominator, and the results of the study are expressed as the "maternal mortality rate". (See the studies in Bali, Bangladesh, Egypt, Ethiopia, India and Jamaica.) Occasionally, all deliveries (miscarriages, stillbirths and live births) are included in the denominator. This may be appropriate when there is not sufficient information on the condition of the infant at birth (e.g., in a household survey). However, using this denominator reduces the ability to compare your results with those of other researchers, since live births are most commonly used.

"How common is maternal death among women in this area?" In order to address this question, use women of reproductive age as the denominator. (See the studies in Egypt, Indonesia and India as examples.) When you do this, the rates reflect two factors: 1) the risk of becoming pregnant; and 2) the risk of dying among women who become pregnant. Thus, anything that affects fertility (e.g. use of contraception) will change this rate. For example, the studies in Egypt and Bali show that the mortality rate per 100,000 live births is nearly four times as high in Bali as in Egypt. This is not surprising, since Bali is much poorer and less developed. However, the mortality rate per 100,000 women of reproductive age is only 50 per cent higher in Bali than in Egypt, in part because use of modern contraceptive methods is so much higher in Bali.

"How important is maternal mortality as a cause of death?". To address this question, the denominator is all deaths of women of reproductive age in the study population, and the results are expressed as a proportion - e.g. maternal deaths make up 23 per cent of deaths among women of reproductive age in the Egyptian and Balinese studies, and 36 per cent in the Indian study.

2.1.3. Why are women dying?

For any single death, there are a number of "causes" operating at different levels. For example, a woman does not die just because she has a postpartum infection, she dies because the infection is not treated properly. There may be many reasons for this: she may not know where to go for help; she may live far from the hospital or be too poor to pay for medical care; or the hospital may not have adequate staff or supplies. Similarly, while maternal age is a risk factor, it is not sufficient to explain the death from pregnancy complications of a 40-year-old woman. Why did she get pregnant at that late age? Did she want another child? Did she know about contraceptives and know where to get them?

There is a real need for studies that look beyond the most immediately apparent reasons for maternal deaths and explore such factors as access to medical and family planning services, and cultural factors. This kind of research would have important implications for preventive programmes.

A major consideration in studying the reasons for maternal deaths is the difficulty of demonstrating causation. A single study cannot prove that one event (e.g. illiteracy) "causes" another event (maternal death). All the study can show is that these two factors are "associated" - e.g., that illiterate women are more likely to die in childbirth than are educated women. But some other factor might be responsible for the association between education and mortality. For example, educated women probably have better access to health care.

For this reason, we usually use the term "risk factors" rather than "causes". A risk factor for maternal mortality is a characteristic that is more common among women who die than among women who do not.

The list of factors that can be investigated is almost endless, so it may be helpful to think of risk factors as belonging to categories, such as maternal characteristics, health system characteristics, and environmental characteristics. Some characteristics can belong to more than one category. For instance, on the individual level education is a characteristic of the woman, whereas the proportion of women who can read is a characteristic of the social environment. Nevertheless, these categories may be helpful as you consider what risk factors to investigate.

Maternal characteristics include age, socioeconomic and marital status, medical status, and reproductive characteristics. Some of these characteristics contain a number of parts. Reproductive characteristics, for example, include obstetric history (number of pregnancies, live births, abortions), contraceptive use, and whether the current or last pregnancy was wanted. The study in Ethiopia showed that unwanted pregnancy is a risk factor for maternal death, particularly from illicit abortion.

Socioeconomic status can be measured by family income (if there is a cash income); by whether the family has a radio, a toilet, or running water; by years of education, marital status, occupation, etc. The most appropriate ways to measure socioeconomic status vary with the community. It might help to consult a local social scientist for advice about which measures are appropriate in your area.

Health system characteristics include adequacy of treatment, staff and equipment, access to care (distance, travel time, cost, administrative barriers).

Environmental characteristics include urban/rural residence, transportation systems, the presence of a medical facility, etc.

In choosing among the vast array of factors, consider what kind of practical recommendations might come from your study and which factors have not been adequately investigated in other studies.

3. STUDY DESIGN

A basic division among studies of maternal mortality is between "population studies" and "case studies". In a population study, an attempt is made to identify and describe all maternal deaths in a defined population (such as a town or region). A population study has a numerator (the maternal deaths), a denominator (the population in which the deaths occurred), and a time period.

Case studies, in contrast, do not describe all deaths that took place within a defined population, and so have no denominator. These studies may focus entirely on the women who died ("case histories") or may compare each woman who died to other women ("case/control studies").

While various study designs are discussed separately, they are not mutually exclusive. In India a case/control study was performed within the larger population study. In Ethiopia and Jamaica, studies of case histories were combined with the population study. The reason for using more than one study design is that each design has advantages and disadvantages.

Besides the kind of study (i.e., population or case study), there is the "direction" of the study. Usually, studies of maternal mortality are done looking backward in time at deaths that have already happened. This is a "retrospective" study. Less common are "prospective" studies. These begin by registering a group of women, and analysing deaths within the group. Both population and case studies can be either prospective or retrospective.

3.1. Population studies

Of the studies cited in this book, those in Bali, Bangladesh, Egypt, Ethiopia, India and Jamaica are population studies. All but the Bangladesh studies are retrospective.

In a retrospective population study, the researcher starts by identifying all the deaths. (There are a number of ways to do this, and these are discussed in detail in the next chapter - "Sources of Data".) The researcher also needs to obtain denominator data, either from the same data source (e.g., a survey) or from other sources. Using these data, measures of frequency are derived. Comparisons can then be made of rates of maternal mortality among groups of women with different characteristics - e.g., various ages, parities, rural versus urban.

In a prospective study, the researcher begins with a group of women (e.g., pregnant women), follows them for a period of time, and then determines what proportion have died. This study design provides data on both the denominator and the numerator.

One of the potential advantages of a prospective population study is that the denominator is clearly the population within which the deaths occurred. In a retrospective study there is often some doubt about the accuracy and appropriateness of the denominator. Also, with a prospective population study one can gather information on a wide variety of characteristics, including some about which little is known from existing data (e.g., distance from a health facility, cultural factors.) Prospective population studies are also useful for obtaining information on maternal morbidity.

The major disadvantage of prospective population studies is that they are usually far more time consuming and expensive than are retrospective population studies. A large number of women must be followed in order to obtain data on enough deaths to produce stable mortality rates or identify risk factors. For this reason, prospective population studies are not usually done just to obtain rates of maternal deaths. A potential problem with prospective studies is loss to follow up of women within the group - especially in areas with substantial migration rates. In addition, a prospective study of pregnant women is less likely than a retrospective study to detect deaths from illicit abortion because women who intend to abort may not admit they are pregnant.

3.2. Case studies

Case studies can provide in-depth information on women who died and the events that led to their deaths. When doing case studies, confidentiality is important to consider because the individual cases may remain identifiable. The families of women who died and the medical staff who treated them need to be assured that confidentiality will be maintained.

3.2.1. Case histories

Over the years, a great many articles have been published on the characteristics of women who died in hospital of maternal causes. In fact, collections of case histories are by far the most common kind of maternal mortality study.

While case histories can be valuable, they have often been misused. For example, maternal mortality rates based on hospital deaths and births are frequently cited as indicators of the level of maternal mortality in a city or country. This is not a valid use of the data, because people in a hospital are never typical of the general population. In developing countries, most women deliver their babies at home. Those who deliver in hospital are usually either upper-class women who use health services in a modern fashion, women who had been referred to deliver in hospital because they were at special risk, or women who had intended to deliver at home but then developed complications. Another basic problem is that there are no appropriate denominators. For every rural woman admitted to the hospital, there may have been a hundred or a thousand others who delivered at home.

In most developing countries, only a fraction of maternal deaths take place in hospitals. In one study in Bangladesh, 53 of the 58 maternal deaths identified took place outside the hospital. The vast majority of women who died had had no medical care at all during their last illness. Furthermore, all the women who died in hospital died of toxæmia, even though less than one-quarter of all maternal deaths were from toxæmia.

As long as the data are not misused, case histories can be extremely useful. For example, while they are not informative about the situation in the region as a whole, analyses of maternal mortality rates in a hospital can demonstrate to the medical and administrative staff that there are problems that need to be corrected.

Studies of case histories can be done on the experience of women before and/or after they enter the hospital. As always, the kinds of questions that can be addressed depends on what information you collect and examine.

In case histories, the importance of a given factor must be self-evident, since women who died are not being compared to women who did not die. For example, if a woman with postpartum infection was kept at home and never received medical care, this obviously contributed to her death. Similarly, if such a woman is brought to a hospital but there are no antibiotics available, this shortage was clearly a contributing factor.

Hospital-based studies of case histories have been done in both developed and developing countries to learn what aspects of medical care, or lack thereof, contributed to maternal deaths, and how future deaths might be prevented. This kind of study is sometimes called a "confidential enquiry" or "case audit." In Tanzania, data on management of the cases by health facilities were collected. In Jamaica and Ethiopia, information was gathered on deaths that took place either within or outside of medical facilities.

When doing an evaluation of medical care, it is important to specify what is the standard against which the treatment is measured - local standards that recognize the availability of staff and supplies, or optimal standards? In the Tanzania study, it was found that lack of blood, supplies or equipment was the most common contributing factor in maternal deaths, even when locally appropriate standards (not optimal standards) were used. The findings were similar in Jamaica. This kind of study can be useful to hospital and Ministry of Health personnel as they work to prevent future maternal deaths.

Community-based studies of case histories are much less common than hospital-based studies. There is much to be learned from such studies. For example, in Ethiopia there was an unmarried girl who died of toxemia. A contributing factor in her death was that her mother was ashamed of her pregnancy and kept her hidden at home, even after she had begun having convulsions. This story illustrates how case histories can be used to gather information on the ways in which cultural factors increase maternal mortality. Such information can be used to help design public education campaigns.

3.2.2. Case/control studies

In recent decades, case/control studies have become increasingly common in many fields of research, but surprisingly few have been done in the area of maternal mortality. This is unfortunate, because case histories can be much more informative if women who died are compared to women who did not.

There are dozens of hospital studies in which women who died of maternal causes are analysed by such factors as age, parity, etc. Without a comparison group, such data have little meaning. For example, just saying that 30 per cent of women who died were having their first child does not demonstrate that first births are more dangerous than later births. In that society, it might be that 30 per cent of all births are first births.

Using hospital data, women who die can be compared to a control group consisting of all other women who deliver in the hospital during the same period of time. This, however, is a great deal of work. Alternatively, a subgroup of women can serve as controls. For example, for each woman who dies, a control can be chosen at random from among the women who delivered in the hospital and survived.

As with any hospital-based study, with a hospital-based case/control study the findings cannot be assumed to apply to the whole population. Certain kinds of women are under-represented among hospital deaths - e.g., women who live in remote areas of the country, who cannot afford medical care or who are ashamed of being pregnant.

While most case/control studies are hospital-based, it is quite possible to do case/control studies in the community. For example, one can identify cases of maternal death using village informants, and then compare them to controls who delivered at home and survived. This design was used in the Indian study.

Case control design has important advantages for certain kinds of research. There are, however, some difficulties with case/control studies. Chief among these is the choice of controls.

The assumption underlying case/control studies is that the risk factors will be found more often among women who die than among women who do not. Therefore, one must allow the risk factors to vary freely.

Any factor that is being held constant cannot be examined for its relationship to maternal mortality. So, for example, if controls are chosen from the same village as the women who died, the effect of distance from the hospital cannot be studied. Similarly, if you take as the control the next woman who delivered in the hospital, you cannot examine the effect of any factor that might be related to that period of time - e.g. kind of medical staff on duty, availability of blood for transfusion. Therefore, unless you have a good reason for wanting to remove a factor from consideration, it is best not to match. "Overmatching" can cause you to miss an association that does, in fact, exist. Moreover, some characteristics are closely related to each other. For example, maternal age and parity increase together. So if you want to study the effect of parity on maternal mortality, you need to remove the effect of age.

An option to consider is using more than one control for each case. This will mean more work and expense, but it has advantages. One advantage is that having two, three or even four controls increases the statistical power of your analysis. This means that you have a better chance of having a statistically significant¹ finding even though the number of maternal deaths in the study is relatively small. Another advantage is that if there is more than one control for each case, they can all be the same kind of controls (e.g., women chosen at random from the same maternity ward), or there can be more than one kind of control for each case - e.g., a hospital control and a community control. Having more than one kind of control group saves you from trying to decide which is the "ideal" control group. Each control group will help you evaluate different risk factors.

In general, deciding what kind of control group to use is difficult. Often there is no ideal group. Consequently, it may be helpful to discuss this matter with someone who has a good deal of experience in doing this type of study.

¹A finding that is unlikely to be fortuitous, to have arisen by chance.

4. SOURCES OF DATA

4.1. Numerator data

Obtaining numerator data for a maternal mortality study is a matter of finding as many of the maternal deaths as possible. This is by no means an easy task, because maternal deaths are always under-reported, even where vital registration is well developed. For example, in the United States a recent study found that maternal deaths were undercounted by 50 per cent because the death certificates did not mention that the death was pregnancy-related.

The easiest mistake to make in a study of maternal mortality is to underestimate its magnitude. So, unless you are prepared to devote substantial time and effort to detecting the deaths - both in hospitals and outside - you should consider doing a case study rather than a population study.

There are several reasons why finding all maternal deaths is very difficult. In many developing countries, vital registration systems are poor or non-existent. In some societies it is considered bad luck to talk about death. People's memories are unreliable (in all countries).

Another difficulty stems from the definition of maternal death - the death of a woman while pregnant or within a defined period (usually 42 days) after the termination of the pregnancy. (See Appendix.) Unless a death was obviously due to pregnancy (e.g., postpartum haemorrhage) the fact that the woman had been pregnant may not be recognized or recorded.

Certain kinds of maternal deaths are particularly likely to be undercounted, either because they are difficult to recognize (e.g., ectopic pregnancies) or because they carry a social stigma (e.g., deaths from illegal abortion and maternal deaths of unmarried women). The deaths of women living on the edges of society (e.g., poor migrants) are also especially likely to be overlooked.

Lesson learned

One key to identifying maternal deaths is to use more than one source of information

There are now enough good studies of maternal mortality to show that there is no single source of information that is reliable. You need more than one source, preferably more than one kind of source (e.g., records and informants). In the Jamaica study, six different sources were used to find maternal deaths, and then the deaths were cross-checked. Only one source (hospital in-patient records) identified as many as two-thirds of the maternal deaths.

Keep your eyes and your mind open to new sources of data. In some instances it will soon become clear which sources are useful in your particular study area. In Bali, all private physicians who were asked to share their records with the researchers did so; in Egypt, there was no cooperation from private physicians.

Sometimes there is no way to know early in the study which sources are reliable and profitable. It turned out that village headmen in Bali and community health workers in India reported only a fraction of deaths, but this could not be known until the information they provided was compared to information from other sources.

It is worthwhile checking information from different sources against one another, so that you can evaluate their quality. For example, if you have both hospital and community data, compare the individual cases to see which ones are missing from each source.

It is also informative to analyse which kinds of deaths are reported by each source. The study in India confirmed that women who die quickly (e.g., from haemorrhage) and women who may be ashamed to go to the hospital (e.g., women with complications of induced abortion) are more likely to die at home than are other women (e.g., those who die of postpartum sepsis).

Also, if possible, try to find information from other studies with which to compare your findings. For example, the researchers in Bali determined at the end of the study that, despite all their efforts, they had found only about one-half of deaths among women of reproductive age. They learned this by comparing the age-specific death rates in their study to those obtained in another study using a different method of identifying deaths. In another country, a researcher knew that a prospective study was being done for a completely different reason. He checked the records of that study to see if there were any deaths among women that had been missed. There were not.

4.1.1. Records

Written records as sources of information on maternal deaths have both advantages and disadvantages. The biggest advantage is that they are relatively easy to find. The biggest disadvantage is that they under report the deaths in the community.

Lesson learned

Don't rely on what is supposed to happen
e.g., chains of reporting. Check the
sources for yourself.

Quite often one is told about a chain of reporting (e.g., from health worker to health center to district administration), or one is assured that a certain person (e.g., the village headman or health worker) will definitely report all deaths. Assume that this is not true.

A. Medical records:

Medical records can never be relied upon for finding all cases of maternal death, especially in developing countries where only a small proportion of deaths take place in hospital. They are, however, an important source of information. If you use records, make sure you make use of all those available - ward books, death registries, morgue records, case notes, etc.

Lesson learned

When using medical records for case finding, always review all deaths among women of reproductive age, not just those listed as maternal deaths, or those taking place in the maternity service

The reason for this is that some women in serious condition may have been admitted to the emergency ward and died there, without ever being treated in the maternity ward. Similarly, the ultimate cause of death (e.g. blood poisoning) may be listed in the death certificate without mention of the underlying cause (illicit induced abortion). So it is important to investigate all deaths where the cause of death is unclear and might be obstetric - e.g., "anaesthetic accident" or "cardio-respiratory failure."

B. Vital registration

In some countries, vital registration systems are well enough developed to be a valuable source of information. However, before you rely heavily on vital registration, find out if there has been an independent assessment of the completeness of recording.

Even if all deaths are reported, vital registration can never be relied on to identify deaths as being maternal. It is essential to investigate all deaths of women of reproductive age that are not clearly due to some other factor - e.g., an accident. Even then, some violent deaths - suicides and homicides - may well be related to pregnancy.

C. Others

There may be other records of deaths in your study area, such as newspapers, church records, police and coroners' reports. These may help you identify additional deaths that can then be investigated. As always, think about who is likely to be left out by a particular source - e.g., rural people, religious minorities and very poor families may bury their dead at home, and not be listed in church records.

4.1.2. Informants

Unless you are going to rely completely on a household survey to identify maternal deaths, you will need to have informants. What kinds of informants will be most helpful will depend on the study area.

A. Official personnel

Any organized group in the study area can be a source of information on maternal deaths, provided that you can get their cooperation. Among the groups of official workers that have been used as informants are community health workers, and school teachers.

B. Community members and groups

A great variety of community informants have been used in maternal mortality studies, including village headmen, traditional birth attendants, school children, and funeral cooperatives.

4.1.3. Household surveys

One of the advantages of a household survey is that family members are less likely to forget the death of a woman than is an informant who was not personally affected by the death. Of course, in a household survey there is still the danger that you will miss the deaths of poor, unattached women (who probably also have high rates of maternal mortality).

The major drawback of a household survey is that it is generally more expensive and complex than other methods of locating deaths. In some instances you may be able to partially overcome this problem by adding some questions on maternal deaths onto a survey being done for another purpose (e.g., a census). However, make sure that the survey design is appropriate to studying maternal mortality. For example, if the field workers are instructed to only interview adult women in the household, you would undercount households in which there had recently been a maternal death.

In any case, in order to locate maternal deaths, a survey needs to be very large. Suppose, as a rough example, that there are 500,000 people living in the region, and that the birth rate is 35 births per 1,000 population per year. If you estimate that the maternal mortality rate is 5 deaths per 1,000 births, then each year there are about 88 maternal deaths in the region. ($500,000 \times .035 = 17,500$ births $\times .005 = 87.5$ maternal deaths.) Of course, the number of deaths is the same no matter what sources of data you use to locate deaths. The difference is that with a survey you would have to interview every household in the region to locate the 88 deaths, which may not be cost-efficient.

To decrease the cost, you could survey only a portion of the households. This is called a "sample survey". However, this also reduces the number of maternal deaths identified, unless you extend the population covered. Having a small number of deaths reduces your ability to look at rates and risk factors for subgroups of women. These things need to be considered before launching a study.

Sampling allows you to cover a wider area, which makes your findings applicable to a larger population (e.g., a whole state rather than a few towns). If you do decide to sample, it is a good idea to get expert help in designing the sampling plan.

Another way to reduce the cost of a survey or increase the number of deaths identified is to increase the recall period - e.g. from the last year to the last two years. Doing this may increase the likelihood that some maternal deaths will be "forgotten". (This is also true when using informants.)

Lesson learned

Even when doing a household survey, it is advisable to use other sources of data as well. In the Ethiopia study, three deaths were identified in hospital records that should have been reported in the survey, but were not.

Most household surveys are retrospective. That is, the investigators ask about deaths that have already taken place. There is another kind of survey, called a "repeat household survey", that is prospective. In this kind of study, there are two or more rounds of the survey. During the first round, a list is made of all the women (or adults, or people) living in the household. During the second round the field worker asks where each of the residents is, and whether any of those missing have died. If any have, their deaths can then be investigated. It seems that this methodology has not yet been used to study maternal mortality. As with any design, there are potential problems, such as loss to follow up in areas with high migration rates. Nevertheless, it might be tried.

4.1. Denominator data

There are three ways to obtain denominator data for a population study of maternal mortality: gather your own raw data (e.g., during a household survey or prospective study); use existing raw data (e.g., birth registries kept by health workers) to make estimates; or use existing estimates from surveys or special studies.

Unless you are doing a household survey as your main study, gathering your own denominator data is not cost-efficient. One reason is that records of births in developing countries are even less complete than those of deaths. Of the seven population studies used as examples in this guidebook, one was a household survey of births and deaths (Ethiopia), and two were prospective studies in which the denominator was the pregnant women registered at the beginning of the study (Bangladesh). In the other four studies, existing estimates were used as denominators.

Using raw data collected by others is usually the least desirable way to obtain denominator data. Under-reporting of births is even more common than under-reporting of deaths.

If you do a household survey of vital events or a prospective study, you can get maternal mortality rates by dividing the number of deaths by the number of births. If you use existing survey data, you will need both fertility rates and population size. Moreover, if you plan to compare maternal mortality rates for various groups of women, you will need a separate denominator for each group. While data on age are usually available, it is rare to find data on parity, education, and many other factors you may want to investigate. If this is the case, perhaps a case/control study would be more appropriate.

When you use existing survey data as the denominator, do so with caution. For example, if the fertility rates are derived from an urban study they may well be too low to apply to a rural population. Remember, using a denominator that is too small is the only way you are likely to over-estimate the maternal mortality rate.

5. PLANNING

The planning stage of a study can be time consuming, but as one researcher said "careful planning in the early stages ... saves a lot of time later."

5.1. Funding

Many people do research as part of their regular job or in their own time. Often, however, outside funding is necessary.

A first step in raising funds is to identify donors likely to be interested in your project¹. These might be agencies concerned with maternal mortality or related subjects - such as maternal and child health, family planning, etc. Or they might be agencies that have a long-standing relationship with your country.

A good way to get information on funders is to talk to other researchers. Find out what agencies they approached and what their experience was. If a particular agency is not willing to fund your study, the people there may still be able to suggest other organizations you might contact.

Lesson learned

Don't give up if your proposal is rejected by the first few funders. The Ethiopian study was turned down by 35 agencies before it was funded by the Swedish Save the Children Federation.

Reducing the cost of your study can increase the likelihood that you will find funding. Make it clear to the funding agency that you are trying to keep the cost to a minimum. Don't ask them to pay for everything. Try to cover some expenses with existing staff, office space, photocopying and data analysis facilities, etc.

Sometimes funders are reluctant to devote money to research because they do not see how it can help improve health in the near future. Emphasize the practical implications of the proposed study - spell out how the findings can be used to help prevent maternal deaths.

5.2. Contacts and clearances

To be successful and useful, research must be a collaborative effort. In order to do a study, one needs the cooperation, support and advice of various organizations and individuals, e.g., clearances from the state or national government; cooperation from doctors, nurses and midwives in order to locate deaths; support from community groups and leaders for a survey. These people may also make valuable suggestions.

And in order for the results to be used to prevent future deaths, local health

¹WHO is always willing to advise on funding and will endeavour to provide support from its own funds. If this does not prove possible, it will help to identify other sources of funding.

authorities need to be interested and supportive. Too many times, researchers have lamented that their findings were not put to use by the hospital management, the government, or the community. A major reason for this is that the people who could make use of the findings were not involved in the development of the study. Perhaps if they felt they had played a role from the beginning they would have been more likely to pay attention to the findings.

Lesson learned

Make contact with the official, professional and community groups relevant to your study as early as possible - even before the study design is final.

Think carefully about both the organizations from which you will need cooperation and people at different levels within those organizations. For example, if you are reviewing hospital records, you will need the permission of a senior person (e.g., director of the hospital) but you will also need the help of the records clerks, ward nurses, etc.

In most countries, a government agency must sponsor your study. In other places having a non-governmental organization or university sponsor is helpful. Find out which applies in your situation.

Here are some of the ways in which researchers have built up support for their studies: formed a study advisory committee or a panel of experts; conducted workshops; obtained letters of explanation and introduction to community groups and local health departments; informed community groups about the purpose of the study.

Getting government agencies, community groups, and other relevant people involved during the planning of the study will not only make your job easier, it will increase their interest in the project. This can, in turn, increase the chances that the findings of your study will be put to use.

5.3. Staff

Many different types of staff can be used to gather information on maternal deaths. In the studies cited in this guidebook, staff ranged from traditional birth attendants (Bangladesh) family welfare assistants (Bangladesh), and family planning workers (Bali) to medical students (Tanzania), social science students (Ethiopia) and experienced interviewers (Egypt and India).

A difficult decision that some researchers face is whether to use existing staff (e.g., government health workers) to gather data, or to hire personnel especially for the study. The benefit of using existing staff is that it is less expensive. Transportation will be less of a problem if they are already travelling around the study area as part of their regular job. Also, they are already familiar with the area and may be on good terms with the people there.

The major disadvantage of using existing staff is supervision. If they do not perform well (perhaps because they have too many duties) the researcher is usually powerless to replace them. So, review their current work load and performance. Do they have time to add another activity? Are they doing a good job with their current tasks? If not, it is unlikely that they will do a good job for your study.

Another problem with using existing staff is that their familiarity with the area and people may prevent them from being impartial and objective. They may think they know all the answers and sit at home and fill in the questionnaires.

What level of education should you require of your staff? If interviewers are going to gather information on the events leading up to deaths, they obviously must be able to read and write. But do they need medical training? Such training makes them more knowledgeable about the information they obtain. On the other hand, several studies have shown that people without medical education can gather information on events and symptoms. This information can then be reviewed by one or more physicians who assign cause of death.

Lesson learned

You may not need medical personnel or even highly educated people to gather data, if they are well trained and supervised.

The main disadvantage of medical personnel is that they are usually expensive and in short supply. But there may also be other disadvantages. Medical personnel (medical students included) may jump to conclusions about cause of death and not write down symptoms that don't agree with their diagnoses. This could bias the study findings. Thus, there are sometimes advantages to having staff who don't consider themselves experts and don't have their own hypotheses. Even if you use medically trained staff, remember that training is absolutely essential.

Another issue is whether the sex of the interviewer matters. Some researchers (e.g., those working in Bangladesh) believe that, in their area, it is best to use women to get information about maternal deaths. Other researchers feel that it does not make a difference in their setting.

In general, think about what kind of biases each kind of worker might bring to your study. For example, health workers and traditional birth attendants may be reluctant to report deaths among the women they serve. (In this kind of situation it is especially important to use multiple sources.)

Finally, whatever kind of worker you decide to use, make sure that the terms of your arrangement are clear: What do you expect from the workers? What can they expect in return? How will they be evaluated? What will happen if their work is not satisfactory? Also, check the employment laws and customs. In Ethiopia, for example, a job is considered permanent after three months.

5.4. Technical assistance

The most important time for technical assistance is early in the study. Technical consultants need not always be brought from other countries. Often there are local resources that can be used. In the Ethiopian study, various kinds of assistance were obtained from local agencies.

Having technical consultants can be valuable even when you have experience, because they can give you a fresh point of view. You may be so involved in your study that you overlook some problem or opportunity.

The following are some of the tasks in which technical assistance can be especially important:

Study design - Getting technical assistance with study design is often valuable. For example, you may want someone to check your figures on the size of the study you will need to do to obtain large enough numbers for the planned analysis.

If you are going to do a sample survey, get help in designing the sampling frames.

Selection of control groups is a complex task. Having an experienced person to help you think this through can be invaluable.

Questionnaire development - Generally, mistakes are caused by overconfidence and haste. Unless you have designed several questionnaires on maternal mortality or a closely related subject, get expert help. Even if you are an expert, another opinion will invariably prove beneficial.

Demographic estimates - In many cases, it makes more sense to use demographers' estimates of birth rates and population size than to try to derive them from your study. Find out if anyone has recently done this kind of work in your area - e.g., national census bureau, international agencies, university faculty or students.

Even if you use published figures, you should consult an expert to see if there is any problem with the way you plan to apply them. For example, the birthrate in a city may be quite different from the national rate.

Data analysis - Even though the data analysis phase comes at the end of the study, if you intend to involve statistical consultants you should do so in the planning phase. They can help you set up your study in a way that makes coding, data entry and analysis easier.

Researchers often assume that they need a computer when, in fact, they don't. A computer is essential only for large data sets (e.g., a household survey) or for complex statistical procedures (e.g., multivariate analysis). For example, the analysis of the Jamaican data was done with a hand calculator.

If you do need a computer, you may not need to buy one. There may be one that you can use that belongs to some institution - e.g., a local university. One problem with this kind of arrangement is that you may have to wait a substantial time for the computer and operators to be free. This happened in the Tanzania study, and the researchers later realized they might have been better off doing the analysis by hand.

Even if you have your own computer, remember the axiom: "stay close to your data". Do at least the basic analyses by hand. Researchers often get important insights in this way.

Remember to include the cost of putting data into the computer when you do your budget.

5.5. Time/action plan

Drawing up a time/action plan for your study is essential if you are doing a large study, have many staff or informants, or if you have definite deadlines for certain phases - e.g., finish the fieldwork before the start of the rainy season. But even with a smaller study, a time/action plan will help you organize your activities and set priorities.

Make sure to include getting clearances, etc., in your plan. If these are delayed, your whole schedule can be thrown off.

Be realistic in your planning. For example, when you move your workers from one area to another it will take them at least a day to get set up and oriented. Think about the logistics of working in a large area. This was a problem in Bangladesh, where most villages are inaccessible during the rainy season. Transportation can be a major effort and expense, and this is often overlooked in the planning stages.

Don't forget to take cultural factors into account when planning a study. In some societies it would not be polite to interview members of a family for the first six weeks after a death. In Bali, people use a number of different names, depending on the circumstances. In Bangladesh, women go to their father's house to have their babies.

Don't underestimate the time required for such mundane things as cleaning and coding of data.

Lesson learned

Most things take longer than we expect

6. SETTING UP

6.1. Developing instruments

6.1.1. Data collection forms

This section is focussed on a particular kind of data collection form - a questionnaire for identifying maternal deaths and their causes. Many of the concepts, however, also apply to other data collection forms, such as those developed for abstracting information from hospital records.

When developing a data collection form, get examples of those used by researchers who have done similar studies. (Some of the forms used in the studies discussed in this book are included in the Appendices.)

To the extent feasible, try to gather information in such a way that your findings can be compared with those of other researchers. For example, there are often a number of ways to ask a particular question. If you use similar wording in your study to that used in a study you admire, you will be better able to compare your results.

Also, use standard definitions. For example, not all researchers define "parity" as including the current pregnancy when a woman dies before giving birth. We suggest that you use this definition. (Definitions are given in the Appendices.)

One of the most common mistakes in research is that people gather much more information than they need or can use. For example, they gather masses of complicated data on socioeconomic status without having a plan for how to use them. If you try to do too much, the cost of the study will go up and the quality of the information will probably go down.

One way to avoid gathering unnecessary information is to plan your data analysis early. For example, design the tables you will use. If you don't know how you are going to use a piece of information, don't include it.

When you develop a questionnaire, do not begin by writing questions. Begin by making a list of the data you need, then write questions that will elicit those data. When possible, precode the answers.

Many researchers suggest getting the interviewers involved in questionnaire development. These are the people who will have to use the questionnaire, so it is good to find out early if there are problems that make it difficult to use. The interviewers may be able to help you with the wording of the questions if they are familiar with the people and culture.

Obtaining good information about maternal deaths is a delicate task. One reason is that the death of any family member is likely to be a sensitive subject, particularly if it was recent and unexpected. In addition, some maternal deaths have social stigma attached to them - e.g., deaths from illicit abortion and maternal deaths among unmarried women. Therefore, the process by which you try to get the information is important.

One way to approach this delicate subject in a survey is to start by asking if anyone in the household has died within the study period. Express sympathy about the deaths. Once you have a list of all deaths, ask the ages of the women who died. If they were of reproductive age, then ask how they died. Finally, if it is not clear whether or not it was a maternal death, ask if the woman was pregnant at her death or in the few months before.

Lesson Learned

It is possible to get information from family and friends about abortion deaths and maternal deaths among unmarried women

Getting this kind of information means that you need to train the interviewers carefully, because they not only need to be able to ask questions in a standardized manner, but they also need to be able to detect subtle clues in the face and voice of the respondent that suggest that they should probe further. Anticipate these situations and practice them with the interviewers during training so that they probe in a standardized manner.

In order to help people remember the timing of events, it is useful to have a calendar of locally important events, such as festivals, national events, seasons. In places where people are not certain of their own or other people's age, a similar technique has proved helpful.

In the studies in Bali and Egypt, the researchers were afraid that if they asked family members about a woman who had died, the family would say she had all of the symptoms listed. This is not what happened. In more than 90 per cent of the cases, the symptoms listed by the family created a picture from which a panel of doctors could assign medical cause of death within broad categories (e.g., heart disease, infection, haemorrhage).

In general, questionnaires should be written in the local language, so that the interviewers will not each be doing their own translations in the field. There are, however, cases where this is not possible. For example, in Bali there are three different languages in use, so it was necessary for the interviewers to translate into different languages, depending on whom they were interviewing. In this kind of situation, it is essential to train the interviewers to do standard translations. Also, if you write the questionnaire in one language and then translate it into the local language, check it by having another person translate it back. This can tell you whether the meaning has changed in translation.

6.1.2. Code book

Develop the code book at the same time as you develop the data collection form. This will save you from finding unseen coding problems when it is too late to fix them without great trouble. For the same reason, you should involve the people who will work on the analysis of the data at this stage.

6.1.3. Instruction manuals

Instruction manuals should be prepared at the same time as the questionnaire. Manuals should clearly state the tasks workers are to perform, and the procedures they should use.

The content of the manuals will depend on the type of study. For example, for a household survey the manual should include instructions on what to do if there is no one home at a house selected for the survey. In Ethiopia, the interviewers were told to try twice more. (Of course, if the worker is following up a report of a death, they should keep on trying.)

Instruction manuals are necessary for studies in which many workers are gathering data. But even if only a few researchers will be involved in your study, it is a good idea to write down the procedures you are going to use. This will help you think through some of the problems you might encounter and develop standard ways to deal with them. It will also give you a record of your methods.

After the pilot study it may be necessary to revise the instruction manual to reflect what you have learned.

6.2. Pre-testing

Researchers are often in a hurry to get their study started, and some decide to save time by doing little or no pre-testing. But when asked what they would do differently if they were to do their study over again, many researchers say they would have spent more time on pre-testing.

Lesson learned

You will be sorry if you don't pre-test.

The pre-test should take place in circumstances as similar as possible to those of the actual study. For example, if the study will take place in a farming community, do not pre-test the questionnaire on a class of college students.

Among the things you want to learn from the pre-test are: Are the questions clear? Is the language understandable, or are there local words that might work better? Does the sequence of questions make sense to the respondents?

You may find that some of the questions get no answer or unreliable answers. For example, people may not know their exact age and round off to the nearest decade. So if the results of the pre-test look strange, you will need to revise your questionnaire.

If you revise the questionnaire at any point, do another pre-test before you use it in the main study.

6.3. The pilot study

In the pre-test you find out how well the data collection forms work. In the pilot study you test the whole system, including data analysis. You need at least one pilot study - more if you make significant changes in design or procedures.

Whenever possible, the pilot study should be done in an area similar to the area where the full study will be, but not the same area. Don't just use the most convenient place - e.g., adjacent to your university or hospital.

The senior researchers should participate in and observe the pilot study so that they can evaluate the results for themselves. (Of course, in order to do the pilot study you will have had to choose and train some staff.)

Some of the questions that a pilot study can answer are the following: Has the staff been well trained? How much time does each interview or case review require? Is the estimated time frame for the study realistic? Are the records adequate? Are informants cooperative? Is the study likely to get the information desired? Are there unforeseen transportation and logistic problems? Does the code book work? If there are different kinds of staff (e.g., interviewers and supervisors), do they work well together? Are the lines of authority clear? Are the supplies adequate? It may be helpful to develop a checklist of issues you want to examine during the pilot study.

The pilot study is also an opportunity to review the research question and study design. Analyse the results of the pilot study the way you will those of the full study. This will show whether you are collecting a lot more information than you need. It is also a chance to see if the data you plan to collect will answer the research question. It may be that the study is too large and cumbersome to conduct with the resources available. You may even decide at this point to alter your study design.

7. MANAGING

Managing a study once it is underway is especially important in a big study involving a large number of staff or informants. Nevertheless, researchers doing small studies may find some of the points in this chapter useful.

Part of managing a study is keeping your eyes open for unexpected opportunities, not just problems. In India, the value of asking school children about deaths in the community was discovered during the study. (This meant that staff had to go back to villages already visited. Otherwise, the intensity of case finding would not have been equal for all villages, and this could have biased the results.) In the Jamaica study too, new sources of information were found as the study progressed.

A key part of managing a study is assigning responsibility. Even in a small study with only a few staff, there needs to be one person who is clearly in charge, and who has the authority, time, resources and training to coordinate and monitor.

In a large study, supervision is of crucial importance, because the quality of data may well depend upon it. If the main researcher is not personally in charge of supervising the workers, he or she must keep in close contact with the supervisors, making frequent field visits if possible.

In order for supervisors to be successful they must consider themselves (and be treated as) trusted colleagues. Therefore, the main investigator must give the supervisors whatever they need to manage the field work: the authority to make certain on-the-spot decisions, a supply of money to handle unexpected expenses, etc. In addition, the main researcher should be supportive of the supervisors, taking time to meet with them and help them solve problems that arise about such practical matters as living conditions, travel difficulties, personnel, community relations.

In a large study, you might consider dividing staff and supervisors into teams. In both the Ethiopian and Indian studies, there was one supervisor assigned to each team of six interviewers.

Supervisors should have regular and frequent meetings with interviewers (e.g., once a week). During these meetings, they can review interviewing technique to see if questioning and probing is being done in a standardized fashion. This is also an opportunity to deal with problems that field workers are encountering that did not arise during the pre-test or pilot study.

Even when the supervisors are doing a good job, it is the responsibility of the main investigator to see that the study is going well. This means making checks on the quality of data being collected. There are several parts to this process.

First of all, data collection forms should be reviewed as soon as possible to see if they are properly and completely filled in. In the Ethiopia study, this was done at the end of every day. If a problem is evident, efforts to correct it can include retraining, pep talks, surprise field visits, or even bonuses for excellent performance. Coding and cleaning of the data should also be ongoing processes.

The reliability of the data collection should be checked as the study progresses. (Reliability is the extent to which you get the same results when you repeat the interview or other observation.) In the Ethiopian study, supervisors re-interviewed 5 per cent of respondents and found that the data collected were more than 90 per cent reliable. In the studies in Bali and Egypt, a 10 per cent reliability check was done on the medical diagnoses assigned by the members of the medical panel, with good results. It is also important to check the reliability of coding.

Analysis of data should not be left until the end of the study, as preliminary results can reveal problems that need correction. But even with such careful ongoing surveillance, it is a good idea to do a formal mid-term evaluation (which includes analysis of the data collected so far). A wide variety of problems can surface during a mid-term review. For example, in the Ethiopia and Balinese studies it was found that fewer deaths had been reported than were expected. While it is often not feasible to make major changes in study design or instruments mid-term, some problems can be corrected at this juncture.

In some studies, the mid-term evaluation is conducted by people other than the main investigator and study staff. In Bangladesh, the expert committee that had been organized at the beginning of the study participated. In Bali and Egypt, outside evaluators were brought in.

8. USING THE FINDINGS

Throughout this book, emphasis has been placed on doing research that will be directly applied to programmes that improve maternal health. This concern was reflected in the sections on choice of study design, and the planning and management of the study. It is therefore appropriate that the last chapter of this book deals with putting the results of the study to work.

If you have heeded the advice given in earlier chapters, then some of the first steps to take in getting your finding known and used are clear. Make a special effort to share your findings with the people who have supported and worked with you from the start of the project - e.g., funders, community groups, government agencies, health workers. Workshops are a good way to present the findings, discuss their implications for programmes, and plan ways to put them to use. There are many ways to use data, depending on the study and the situation. Don't limit yourself to papers and presentations. Work with the appropriate groups on developing programme policies and plans, teaching materials for midwives and physicians, maternal mortality review committees, hospital management councils, emergency transportation systems, blood banks, community education campaigns and materials, etc.

Your research findings may well be useful to people working in other parts of the country, region and world. To reach this wider audience, present your results at professional meetings, hold seminars and press conferences, and publish the findings and recommendations in national and international professional journals.

9. APPENDICES

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B ANNOTATED GLOSSARY

In order to compare the results of various studies, either within or between countries, researchers need to use standard definitions of terms.

Maternal Death

WHO's International Classification of Disease (9th Revision) defines a maternal death as "the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration or site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental causes."

Sometimes all deaths among women who have been pregnant within 42 days are included among maternal deaths, and the deaths then divided into three groups: "direct obstetric deaths" (those resulting from complications of pregnancy, delivery or their management); "indirect obstetric deaths" (deaths due to existing medical conditions that were aggravated by pregnancy or delivery); and "fortuitous deaths" (those unrelated to pregnancy).

It does not pose a problem for comparability if researchers use this definition, because if fortuitous deaths are subtracted, the deaths remaining conform to the WHO definition.

In some countries (e.g., the United Kingdom) the period for inclusion is extended to one year (rather than 42 days). Various studies have shown that some maternal deaths do take place after more than 42 days. This is proportionately more common in developed countries, where women who eventually die can be kept alive for a long time with sophisticated technology. But some late deaths take place in developing countries as well. In the Ethiopia study a number of deaths occurred more than 42 days after termination of pregnancy, most of them due to illicit induced abortion.

If you use a period longer than 42 days, also present your findings in such a way that other researchers can compute the rate for deaths within 42 days, so that your results can be compared with those from other studies.

Maternal mortality rate

The "maternal mortality rate" is the number of maternal deaths per 100,000 live births. In fact, this is a ratio and not a rate. But this definition is widely used and has been adopted by WHO.

Sometimes the maternal mortality rate is expressed per 10,000 or per 1,000 (rather than per 100,000) live births. While this is possible in areas where maternal mortality is high, it can lead to confusion when comparing studies.

Parity

Parity, in the context of maternal mortality, is conventionally defined as the number of previous pregnancies of more than 28 weeks gestation, plus the present pregnancy (whatever the gestation).

Women of reproductive age

The reproductive age range is defined in various ways - usually of 15-44 or 15-49 years of age. Within this range, subgroups are presented in five-year increments.

You may wish to lower the minimum boundary - to age 10 or 12 - in order to measure the risk of death among young adolescents. Or you may raise the upper boundary to 50, since in many countries people round off their age, so that women aged 49 might say they are 50.

As with any departure from standard definitions, the important point is to present your data in such a way that other researchers can recalculate your basic statistics so that they can be compared with those from other studies.

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D SAMPLE STUDY INSTRUMENTS

1. Instruction manual: Chapters 1-3 (Ethiopia study)
2. Questionnaire on Background Characteristics (Bali Study)
3. Symptom Questionnaire for gathering information on cause of death (Bali study)
4. Maternal Death Form for abstracting medical records and informants reports (Jamaica study)
5. Interview Schedule from case/control study (India)

Instruction Manual

From: Maternal Health Care Addis Ababa Community Survey. B. Kwast.

Chapter 1

Introduction

1.1 Scope and coverage of the community survey on maternal health in Addis Ababa

The Community Survey 1974/1975 E.C. is designed to obtain estimates of reasonable precision on different parameters of births, infant and maternal mortality in Addis Ababa. The objectives of the survey are:

1. To register births, perinatal and infant mortality.
2. To determine the incidence, distribution and causes of maternal mortality.
3. To determine the utilization of maternity services during pregnancy and delivery and the involvement of trained and untrained traditional birth attendants by women during childbirth.
4. To utilize this information for the improvement of maternity services in Addis Ababa.

1.2 Role of the enumerator and supervisor

The enumerator's task is central in the whole survey, to the information collected and the quality of the survey. It is important that both enumerators and supervisors working for the survey follow carefully the procedures laid down by the survey organizers. The enumerators come into contact with the survey organizers through the supervisors. The supervisors are based in the respective Kebele Office. Supervisors will provide enumerators with materials and instructions, collect and check their work and try to help with problems they may come across in the field. Enumerators will remain in constant touch with supervisors.

The supervision of enumerators work is an integral and necessary part of the survey which aims at collecting data of high quality. The supervisors will check the completed work of the enumerators. They will also be concerned with administrative and organizational aspects of the survey.

After the interviews have been completed and the forms and questionnaires have been checked by both the enumerators and their supervisors, they are put through a further checking procedure. This is done so that any errors that were overlooked can be corrected. After this checking procedure, the answers on the questionnaires are then transferred onto a computer.

Data will be processed and analysed and a report will be prepared showing the principal findings of the survey, which can then be used for further planning and improvement of services to mothers and their children.

1.3 Training

Your training as enumerator or supervisor is crucial to the success of the survey. Your training will consist of a combination of practical and classroom teaching. In order to train you effectively, a combination of techniques will be used. One will be the demonstration interview, in which you will listen to or interview or more. This will provide you with experience of seeing how an interview proceeds. During the training, the questions included in the housing list and the questionnaires will be discussed in detail. At this stage you will participate in role playing interviews where you will be given the opportunity to participate as enumerator, respondent or observer. Your training does not end when the formal training period is completed. Each time a supervisor or survey organizer meets with you in the field to discuss your work, your training is being continued. The formal training period merely provides you with the basic knowledge and

information regarding the survey, questionnaires and procedures. Continued observation and supervision during the field work completes the training process. This is particularly important in the first few days of the field work.

1.4 Survey documents

The documents to be used in the field are:

Housing unit list - Registration of births/abortions

- Registration of maternal deaths
- Registration of mothers presently pregnant

Questionnaire I

- Details of birth/abortion in 1974 or 1975
and utilization of maternity services.

Questionnaire II

- Details of second birth/abortion in 1974 or
1975 E.C. and utilization of services.

Enumerators and supervisors should be thoroughly familiar with these documents as well as with the Instruction Manual. In addition you will carry into the field a file, questionnaire and housing unit lists, your identity card and your identifying letter.

1.5 Quality control during field work

To ensure good and constant quality of work, the supervisor will do the following during the field work:

1. He will scrutinize in detail all the questionnaires and housing lists completed by the enumerator and see that the required information is complete.
2. The supervisor will each day randomly select 10 houses and visit these to confirm the information obtained on housing unit lists and questionnaires, by conducting a second interview.
3. The supervisor will re-visit a house in case the enumerator faced a particular problem and complete the missing information.
4. The supervisor will from time to time visit houses together with the enumerator to provide encouragement and advice where necessary.
5. The supervisor will meet the enumerators daily in the morning and/or afternoon to collect completed forms, distribute further supplies and discuss the work.
6. The supervisor will be in regular contact with the survey organizers to report on the progress of the work and to discuss further organization and possible problems.

Enumerators will have contact with the survey organizers at least once a week.

Finally, the organizers may decide to discontinue the work of a supervisor or enumerator during the field work if his/her performance is not considered adequate for the high quality this survey aims at.

Chapter 2

The Enumerator's task

2.1 Relationship to the supervisor

For a proper appreciation of your role, you must first clearly understand your relationship to your supervisor.

1. While you do most of the actual interviewing, your supervisor is responsible to the survey organizers for ensuring that you do your work satisfactorily. This means that the supervisor assigns work to you.

Since the supervisor has to plan the work in the area so that it is conducted as efficiently as possible, and is completed within the time allowed, it is your duty to complete the work allocated as punctually as possible. You should meet with your supervisor every morning and hand in the completed forms either on the same day in the afternoon or on the next morning, so as to enable the supervisor to check the completed information.

2. Upon receiving the completed forms, the supervisor will check these to see that the interviews have been completed correctly and that the standard procedures as laid down by the survey organizers have been followed. You will discuss your previous work with your supervisors daily and amend any omissions as have been shown to you. This gives you a chance to discuss any problems with your supervisor and get help and advice whenever necessary.

3. Your supervisor has been asked by the survey organizers to revisit some of the houses after you have interviewed the residents. During these visits the supervisor verifies that no mistakes were made in identifying births and may also obtain some additional information. Such revisiting by supervisors is used in all surveys and is an integral and necessary part of a survey which aims to collect data of high quality.

4. The supervisor serves as a link between you and the survey organizers. Just as he informs you of the survey organizer's instructions, you must inform him in return of any problems or difficulties you may experience. If, for example, you are not clear about a particular part of the organization or about the meaning of a question in a questionnaire you should seek the advice of the supervisor.

2.2 Securing supplies and information

Before going into the field, make sure that you have the following:

1. A copy of the "Instruction Manual".
2. Identity card and letter of introduction.
3. A file with forms and questionnaires.
4. Pencil, rubber.

Before you start home visiting each day make sure that you have an adequate supply of questionnaires with you and that you have had contact with your supervisor.

The housing unit lists are pre-numbered and you will be given lists on which the houses are consecutively numbered. In this way a specific area within a Kebele has been allocated to you and you should not change numbers on the housing sheets, nor exchange lists with other enumerators.

Questionnaires have also been pre-numbered and you are requested not to change these numbers on any account. If there are any problems with numbering, you should seek advice from your supervisor.

2.3 Identification of houses and conducting the interview

As the houses have already been selected, it will be helpful to familiarize yourself with the area where the houses have been allocated to you first. As the Kebele's have been informed officially, a guide can show you the route first, after which you start with the survey. The information on the housing unit list has to be completed first as you will then identify those qualifying for administration of the questionnaire.

1. Eligibility for administration of questionnaire

Remember that the houses you visit must only be those indicated on the housing list. (Every 6th house is left out through random sampling).

The whole survey stands or falls with the careful and complete filling in of the housing unit list. If you have identified eligible women for administration of the questionnaire, you will proceed to fill in Questionnaire No. I. If there is a birth or abortion in both 1974 and 1975 or if there are two births or abortions in one year, you also complete Questionnaire No. II. Page 3 of Questionnaire No. I is completed only if a maternal death occurred. You have a separate supply of page 3 of Questionnaire No. I which you will complete and attach when applicable.

2. Consistency of answers

It is very important during an interview to make sure that the answers given to various questions are consistent with each other. You should check during the interview itself that the information you are getting is consistent. This requires a thorough familiarity with the questionnaire. It also requires presence of mind during the interview.

2.4. Checking completed questionnaires

After an interview has been completed, you must review the questionnaire you have just completed. This check means going over the entire interview, reading carefully through all relevant questions and answers. While checking, you may correct your handwriting or clarify answers where needed. You should make the following checks on every housing list and questionnaire completed:

1. Has the information for identification of the interview been provided? This is most important.
2. Have the answers been recorded legibly and completely? Every column or question should have an answer.
3. Is the form dated, with name of enumerator filled in?
4. Have interview instructions been followed correctly? While you may correct any minor errors which obviously may have been caused by mis-recording, you must never alter anything in the completed questionnaire without asking the respondent the relevant question again. Also, copying the entire information onto a new questionnaire should not be done.

2.5 Dealing with non-response

Non-response means failure to obtain complete information on housing list or questionnaire. You must attempt to obtain a complete interview from a resident in the house, preferably a senior woman or mother of a child, if possible. One of the most effective ways of reducing the extent of non-response is to make repeated visits to the house in question. Occasionally a neighbour can be interviewed if she has an intimate knowledge of the residents of the house in question or if it is a one person household only.

However, you must make sure that in such a case there was no woman in that house in the last two years (1974/1975) who gave birth and might have died. This requires very careful questioning, in order not to miss births or deaths. Failure to obtain an interview may result from one of the following:

1. Failure to find any resident in the house

Residents may be out at work or the house may be empty. Make a note on the housing list - either: 'revisit' or 'empty' and report to supervisor.

2. Refusals

Whether or not residents in a house are willing to co-operate depends very much on the initial impression you make on them. You must introduce yourself properly, explain the purpose of your visit and assure the respondent of the confidential nature of the information you are going to obtain. If a resident appears to be unwilling to be interviewed, do not take this to mean final refusal. She may not want to be interviewed at that particular time, or may have misunderstood the purpose of your visit. Explain the situation again; ask her if you can come to see her at some other time. If the refusal appears to be final, report to the supervisor.

3. Not at home

If on your visit you do not find the appropriate resident at home, you must make another visit. If during the second visit the appropriate person is not at home, try to collect the relevant information from another member of the house or an intimate neighbour. If unsuccessful, the neighbours should be asked when the person is at home and in that case a repeat visit must be made on a Saturday afternoon or on Sunday. Indicate 'revisit' on housing unit list, in margin.

4. Incomplete interview due to any other reason

If an interview is left incomplete, either because something interrupted it, or because you left out some questions by mistake, you must go back to the house as soon as possible so that you can complete it without having to repeat the entire interview.

2.6 Returning forms and questionnaires

You should return completed housing lists and questionnaires to your supervisor daily and discuss your work with him.

2.7 Summary of procedure

1. Before starting out each day, make sure you have enough supplies of questionnaires and housing lists.
2. Have contacts with your supervisor at least once a day in the morning or afternoon.
3. Return completed forms to your supervisor daily.
4. Try to check the questionnaires before leaving the house where the interview took place. In any case you should check it before returning it to the supervisor.
5. If you make an unsuccessful visit to a house, you should make a revisit. Check that you write the correct identification on the forms.
6. Report back to the supervisor about all the completed work and discuss any problems arising.

Chapter 3

How to conduct an interview

3.1 Introduction

An interview is a means of obtaining information from someone by asking him questions. It is somewhat like an ordinary conversation in that there are two persons talking. However, it differs from ordinary conversation in several respects.

1. The interviewer (enumerator) and the respondent are strangers to each other. One of your main tasks is to gain the confidence of the respondent or other resident in the house so that she/he is at ease and willing to answer the questions you are asking.
2. Unlike normal conversations, one person is asking all the questions and the other person is answering them all. You must refrain from giving your opinion and you should not react with disapproval to anything the respondent tells you. At all time throughout the interview you must remain strictly neutral. However, you should show interest in the answers and be understanding and encouraging by saying something like 'I see' or 'Yes'.
3. There is a sequence of questions that must be asked. You should follow this sequence and be in control of the interview situation so that you will maintain the interest of the respondent throughout the interview.

3.2 Principles of interviewing

Below is a summary of some important points to be kept in mind during the interview.

1. Gaining access to the respondent

As mentioned above, you and the respondent are strangers to each other. Yet you must approach the respondent and, in a very short time, gain her confidence and co-operation so that she/he will answer all the questions. The first impression of your appearance, and the first things you do and say, are of vital importance in gaining the respondent's co-operation. So first you must be sure that your appearance and behaviour are acceptable to the respondent and also to other people in the area in which you will be interviewing. When visiting a house the first thing you should do is to introduce yourself and state where you are coming from and the purpose of your visit. You may mention the confidentiality of the survey and explain that no individual names will be used, other than for follow-up purposes of a pregnant woman. You show your identifying letter only if the respondent specifically asks for it. The respondent may want to know why you have come to that particular house. Explain that the houses were selected at random and that houses in other Kebeles have been selected in the same way; it is therefore a matter of chance that this particular house was chosen. You should at all times be patient and tolerant and these characteristics will determine the success of the survey.

2. Privacy

It is important that the individual interview be done privately. Teenage children and those of neighbours should be asked not to be present at the interview. While other women or the husband may be present at the interview, the respondent should answer all the questions her/himself. The presence of other people not related to the respondent may influence some of the answers and they should therefore be asked politely to leave.

3. Neutrality

Most people are polite, especially to strangers, and they tend to give just those

answers and create the right impression which they think the other people will be pleased with. It is therefore important that you remain absolutely neutral towards the subject matter of the interview. Do not tell the respondents your own opinion.

If the respondent is reluctant or unwilling to answer a question try to overcome that reluctance, explaining once again the confidential nature of the information and by stating that the same questions are being put to respondents all over the city of Addis Ababa. If she/he still refuses, make a note 'refused to answer' next to the question and proceed as if nothing has happened. If you have successfully completed the interview, you may try to obtain the missing information at the end, but do not push too hard for an answer. Inform your supervisor of any problems. If there is a sick person in the house or a pregnant woman who has problems, and you are asked for advice tell your supervisor who will take the matter up with the survey organizers. If you meet a pregnant woman, you may ask her whether she is attending antenatal clinic and if not already attending, advise her to go to the nearest Maternal and Child Health (MCH) clinic for check-up. Remember that the purpose of the survey is to help people and improve the health care. Please advise people to take their babies for vaccination if applicable.

4. Controlling the interview situation

If the respondent is giving irrelevant or elaborate answers, do not stop her/him rudely, but listen to what he/she has to say; then try to steer him/her gently back to the original question. Remember, you are conducting the interview so should be in control of the situation. A good atmosphere must be maintained throughout the interview. The best atmosphere for an interview is one in which the respondent sees the enumerator as a friendly, sympathetic and responsive person who does not intimidate her/him and to whom she/he can say anything without feeling shy or embarrassed. Questions around childbirth and subsequent events concerning her children may require her to recall painful experiences and it is important that you remember that questions related to such events are sensitive.

3.3 The art of asking questions

This art will be acquired with practice, but there are certain basic points which you must bear in mind. The most important point to remember is the one already mentioned: neutrality. Do not indicate which of the possible answers you expect from the respondent.

1. Wording of the questions

It is very important that you ask the questions as they are explained in the instruction. There are reasons for this. Firstly, the questions have been carefully constructed and altering the wording can alter the meaning of the question and thereby alter the answer. Secondly, altering the wording can also affect the neutrality of the question, again influencing the answer.

2. Repeating the question

Interviewing is not always merely a matter of reading out questions and writing down answers. A question put to the respondent may not immediately produce a relevant response. Indeed, it may produce a vague, irrelevant or contradictory answer or the respondent may refuse to answer or say 'I don't know'.

Often difficulties arise because:

- a. Respondent may have misunderstood the situation and say she does not know or refuse to answer because she is afraid. If you sense this, remove the misunderstanding by reassuring her of the confidentiality of the information given.
- b. Respondent may have misunderstood the question. You should repeat the original question to obtain the desired information and only when that fails, you should go on to explaining or asking additional questions.

3. Explaining and re-phrasing

Occasionally it may happen that a respondent finds it difficult to understand a particular question. In such cases you may rephrase the question. However, be careful not to alter the meaning of the question.

4. Probing

It can happen sometimes that the respondent's answer to the question is not satisfactory from your point of view. Sometimes the respondent may be unable to answer the question as it was put to her/him. If this happens, then in order to obtain a complete answer to the original question, you have to ask some additional questions. This is called 'probing' or 'asking indirect questions', e.g. after having asked whether a particular woman had a birth (delivery) or abortion in the last two years or in 1974 or 1975, you ask:

- i) "How old is your last child?" It may then transpire that the woman had a child within the last two years.
- ii) Or if her last child is, for instance, 7 years old, you ask: "Have you had any child or abortion since that 7 year old child?" This may reveal that she had a child after the 7 year old, but it may have been still born or died subsequently or she may consider this to be an abortion. Therefore the woman doesn't think this is relevant or important information.

There are some examples of incorrect indirect questions. These should not be used since they are not neutral but suggest an answer to the respondent:

- i) "This is the only child you have, isn't it?"
- ii) "I suppose you did not have another child after this one?"
- iii) "I suppose you are not pregnant now, are you?"
- iv) "Where did you go for antenatal care?"

Asking indirect questions to ascertain correct information is possibly the most challenging job of the enumerator and supervisor. It also becomes the most satisfying, especially when good answers are obtained as a result of it.

3.4 Avoiding expectations

The background, attitude and personality of the respondent will often be different from that of the interviewer. Be careful to avoid expectations about the ability of the respondent to answer particular questions. Do not abbreviate or alter questions because the respondent appears to be intelligent. Do not suggest or assume answers because the respondent is less educated than yourself. The respondent may be distrustful or afraid, she/he may say things she/he thinks you are expecting or which are generally desirable.

Be sensitive to the respondent's expectations and be reassuring about the nature of the survey. If she/he cannot answer a question directly, wait and never be impatient. If you do not understand her/his answer, ask again without implying it is her/his fault. Consciously avoid your own expectations during the interview.

RAMOS

BACKGROUND CHARACTERISTICS

B

Name of deceased: _____

Name of respondent: _____

Date of death: _____

Relationship to deceased: _____

Address: _____

<p>1. Regency number: <input type="text"/></p> <p>2. District number: <input type="text"/></p> <p>3. Case number: <input type="text"/></p> <p>4. Date of death: <input type="text"/></p> <p>5. Date of interview: <input type="text"/></p> <p>6. How old was she? (refer to list of events if necessary) <input type="text"/></p> <p>7. What was the last grade in school she completed? <input type="text"/></p> <p>8. What was the last grade in school her husband completed? <input type="text"/></p> <p>9a. Is her husband a farmer? 0) no → SKIP to question 10 1) yes <input type="text"/></p> <p>b. Does he own his land? 0) no, rents 1) yes, owns 2) yes, both <input type="text"/></p> <p>c. How many hectares of paddy does he tend? <input type="text"/></p> <p>d. How many rice harvests does he get each year? <input type="text"/></p> <p>e. How many cows does he have? <input type="text"/></p> <p>10. Is her husband a fisherman? 0) no 1) yes <input type="text"/></p> <p>11a. Is her husband a nonagricultural worker? 0) no → SKIP to question 12 1) yes <input type="text"/></p> <p>b. What is his occupation? <input type="text"/></p> <p>c. Is this job government or nongovernment? 1) government 2) nongovernment → SKIP to question 11e <input type="text"/></p> <p>d. What grade is this job? (now go to question 12) <input type="text"/></p> <p>e. Is he self-employed? 0) no 1) yes <input type="text"/></p> <p>12. Is there a water supply in the compound where she lived? 0) no 1) yes, well 2) yes, tap 3) yes, other 4) don't know <input type="text"/></p>	<p>13. Are there toilet facilities in the compound where she lived? 0) no 1) yes, flush toilet 2) yes, latrine 3) yes, other <input type="text"/></p> <p>14. Did she smoke tobacco? 0) no 1) yes 2) don't know <input type="text"/></p> <p>15. Did she chew tobacco or betel? 0) no 1) yes, tobacco 2) yes, betel 3) yes, both 4) don't know <input type="text"/></p> <p>16. How many living children did she have? <input type="text"/></p> <p>17. How old is the youngest? (completed years) 00) less than 1 year 99) don't know <input type="text"/></p> <p>18. Had she been pregnant since this child was born? 0) no 1) yes 2) don't know If YES, give the date this pregnancy ended: _____ <input type="text"/></p> <p>19. How many live births had she had? <input type="text"/></p> <p>20. How many stillbirths? <input type="text"/></p> <p>21. How many miscarriages? <input type="text"/></p> <p>22. How many induced abortions? <input type="text"/></p> <p>23. Now that makes how many pregnancies altogether? (check for consistency) <input type="text"/></p> <p>24. Did she (or her husband) ever use any method of family planning? 0) no 1) yes 2) don't know <input type="text"/></p> <p>25. Since her last pregnancy did she (or her husband) use any method of family planning? 0) no { terminate 1) yes 2) don't know } interview <input type="text"/></p> <p>26. What method was that? 1) tubal ligation 2) IUD 3) pills 4) injection 5) condom 6) foam 7) diaphragm 8) other, specify _____ <input type="text"/></p> <p>27. Since the last pregnancy, did she ever stop using family planning? 0) no { terminate 1) yes 2) don't know } interview <input type="text"/></p> <p>28. When did she stop using family planning? <input type="text"/></p> <p>29. For how long did she stop? (number of months) <input type="text"/></p>
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RAMOS

A
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Form
COMMENTS

6a. Do you know what _____ died of? 0) no 1) yes

b. What was it? _____

Scoring grid for question 6a: A vertical column of boxes. The top box is labeled '20' and is empty. The two boxes below it are labeled '21-22' and are shaded with a cross-hatch pattern.

7a. How long was she unwell before she died? _____

b. Was she perfectly well before that? 0) no 1) yes 2) don't know

Scoring grid for question 7a: A vertical column of boxes. The top two boxes are labeled '23-24' and are shaded with a cross-hatch pattern. The bottom box is labeled '25' and is empty.

8. How long is it since she could do her usual work? _____

Scoring grid for question 8: A vertical column of boxes. The top two boxes are labeled '26-27' and are shaded with a cross-hatch pattern.

9. During the illness (or after the accident) that caused her death, was she seen by a doctor, nurse or other health worker? 0) no 1) yes 2) don't know

Who? _____ Where? _____

Scoring grid for question 9: A single empty box labeled '28'.

Now I am going to ask you about a lot of symptoms she may have had before she died. Just tell me about the symptoms she had during her final illness.

10a. Was she in pain? 0) no → SKIP to Question 12 1) yes 2) don't know

b. Where was the pain? 1) head 2) belly 3) chest 4) breast 5) legs 6) other 7) all over 8) don't know

c. How long did she have this pain? _____

Until she died? 0) no 1) yes 2) don't know

d. How long ago did it start? _____

Scoring grid for question 10a: A vertical column of boxes. The top box is labeled '29' and is empty. The next box is labeled '30' and is empty. The next two boxes are labeled '31-32' and are shaded with a cross-hatch pattern. The next box is labeled '33' and is empty. The bottom box is labeled '34-35' and is shaded with a cross-hatch pattern.

11a. Did she have a pain anywhere else? 0) no 1) yes 2) don't know

b. Where was the pain? 1) head 2) belly 3) chest 4) breast 5) legs 6) other 7) all over 8) don't know

c. How long did she have this pain? _____

Until she died? 0) no 1) yes 2) don't know

d. How long ago did it start? _____

Scoring grid for question 11a: A vertical column of boxes. The top box is labeled '36' and is empty. The next box is labeled '37' and is empty. The next two boxes are labeled '38-39' and are shaded with a cross-hatch pattern. The next box is labeled '40' and is empty. The bottom box is labeled '41-42' and is shaded with a cross-hatch pattern.

12a. Was she bleeding from the vagina? 0) no 1) yes 2) don't know

b. How long before she died did it start? _____

c. Was she bleeding right up to when she died? 0) no 1) yes 2) don't know

d. Was it so much that it soaked her clothes? 0) no 1) yes 2) don't know

Scoring grid for question 12a: A vertical column of boxes. The top box is labeled '43' and is empty. The next two boxes are labeled '44-45' and are shaded with a cross-hatch pattern. The next box is labeled '46' and is empty. The bottom box is labeled '47' and is empty.

13a. Was she bleeding from anywhere else? 0) no 1) yes 2) don't know

b. Where? _____

c. How long before she died did it start? _____

d. How long did it last? _____

Until she died? 0) no 1) yes 2) don't know

Scoring grid for question 13a: A vertical column of boxes. The top box is labeled '48' and is empty. The next box is labeled '49' and is empty. The next two boxes are labeled '50-51' and are shaded with a cross-hatch pattern. The next two boxes are labeled '52-53' and are shaded with a cross-hatch pattern. The bottom box is labeled '54' and is empty.

14a. Did she have a cough? 0) no 1) yes 2) don't know

b. How long before she died did it start? _____

c. How long did it last? _____

Until she died? 0) no 1) yes 2) don't know

d. Was she bringing up any spit? 0) no 1) yes 2) don't know

e. Was there blood in it? 0) no 1) yes 2) don't know

Scoring grid for question 14a: A vertical column of boxes. The top box is labeled '55' and is empty. The next two boxes are labeled '56-57' and are shaded with a cross-hatch pattern. The next two boxes are labeled '58-59' and are shaded with a cross-hatch pattern. The next box is labeled '60' and is empty. The next box is labeled '61' and is empty. The bottom box is labeled '62' and is empty.

RAMOS

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Form
COMMENTS

- 15a. Did she have a fever? 0) no 1) yes 2) don't know
- b. When did you first notice it? _____
- c. How long did it last? _____
Until she died? 0) no 1) yes 2) don't know
- d. Did she have any shaking chills? 0) no 1) yes 2) don't know

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	68
	69

- 16a. Did you notice anything unusual about her color? 0) no 1) yes 2) don't know
- b. Was she pale? 0) no 1) yes 2) don't know
- c. Was she yellow? 0) no 1) yes 2) don't know
- d. Was she blue? 0) no 1) yes 2) don't know

	70
	71
	72
	73

- 17a. Had she been vomiting? 0) no 1) yes 2) don't know
- b. How long before she died did it start? _____
- c. How long did it last? _____
Until she died? 0) no 1) yes 2) don't know
- d. Was she able to keep anything down at all? 0) no 1) yes 2) don't know
- e. Did she ever vomit pure blood? 0) no 1) yes 2) don't know

	74
■	75-76
■	77-78
1	79-80
	8
	9
	10

- 18a. Did she have diarrhea? (frequent passage of liquid stools) 0) no 1) yes 2) don't know
- b. How long before she died did it start? _____
- c. How long did it last? _____
Until she died? 0) no 1) yes 2) don't know

	11
■	12-13
■	14-15
	16

- 19a. Did she have black stools? 0) no 1) yes 2) don't know
- b. How long before she died did this start? _____
- c. How long did it last? _____
Until she died? 0) no 1) yes 2) don't know
- d. Was there anything else unusual about her stools? 1) blood 2) mucus 3) pus
4) rice water stool 5) other

	17
■	18-19
■	20-21
	22
	23

20. Did she have any difficulties with urination? 0) no → SKIP to Question 25
1) yes 2) don't know

	24
--	----

- 21a. Was she unable to pass any urine? 0) no 1) yes 2) don't know
- b. How long before she died did this start? _____
- c. How long did it last? _____
Until she died? 0) no 1) yes 2) don't know

	25
■	26-27
■	28-29
	30

RAMOS

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22a. Too frequent urination? 0) no 1) yes 2) don't know

b. How long before she died did this start? _____

c. How long did it last? _____

Until she died? 0) no 1) yes 2) don't know

	31
■	32-33
■	34-35
	36

23a. Painful urination? 0) no 1) yes 2) don't know

b. How long before she died did this start? _____

c. How long did it last? _____

Until she died? 0) no 1) yes 2) don't know

	37
■	38-39
■	40-41
	42

24a. Bloody urine? 0) no 1) yes 2) don't know

b. How long before she died did this start? _____

c. How long did it last? _____

Until she died? 0) no 1) yes 2) don't know

	43
■	44-45
■	46-47
	48

25a. Did she get tired easily? 0) no 1) yes 2) don't know

b. When did you first notice this? _____

c. How long did it last? _____

Until she died? 0) no 1) yes 2) don't know

	49
■	50-51
■	52-53
	54

26a. Had she lost weight? 0) no 1) yes 2) don't know

b. When did you first notice this? _____

c. Was the weight loss excessive? 0) no 1) yes 2) don't know

	55
■	56-57
	58

27a. Was any part of her body swollen? 0) no 1) yes 2) don't know

b. What part? 1) belly 2) face 3) legs and feet 4) face, legs and feet 5) other

c. When did you first notice this? _____

d. How long did it last? _____

Until she died? 0) no 1) yes 2) don't know

	59
	60
■	61-62
■	63-64
	65

28a. Was she short of breath? 0) no 1) yes 2) don't know

b. When did you first notice the shortness of breath? _____

c. How long did it last? _____

Until she died? 0) no 1) yes 2) don't know

	66
■	67-68
■	69-70
	71

29. Did she have asthma? 0) no 1) yes 2) don't know

	72
--	----

RAMOS

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Form
COMMENTS

30a. Had she lost the use of any of her limbs? 0) no 1) yes 2) don't know

- b. Which ones? Right leg? 0) no 1) yes 2) don't know
Left leg? 0) no 1) yes 2) don't know
Right arm? 0) no 1) yes 2) don't know
Left arm? 0) no 1) yes 2) don't know

- c. How long before she died did this happen? _____
d. How long did it last? _____
Until she died? 0) no 1) yes 2) don't know

31a. During her last illness, did she ever collapse? 0) no 1) yes 2) don't know

- b. How many times?
c. Did she lose consciousness? 0) no 1) yes 2) don't know
d. Did she shake or convulse? 1) shake 2) convulse 3) neither, limp

32. Did she have epilepsy? 0) no 1) yes 2) don't know

33a. Was she ever told that she had high blood pressure? 0) no 1) yes 2) don't know

- b. Who told her? 1) doctor 2) other health worker 3) don't know
c. How long ago was that? _____

34a. Was she pregnant when she died? 0) no 1) yes 2) don't know

- b. How many months along was she? → *SKIP to question 37*

35a. Had she been pregnant recently? (8 weeks or less) 0) no 1) yes 2) don't know

- b. How did the pregnancy end? 1) live birth 2) stillbirth 3) spontaneous abortion
4) induced abortion
c. Did she lose an unusual amount of blood? 0) no 1) yes 2) don't know
d. How long before she died did the pregnancy end? _____

36. How long ago was her last menstrual period? (weeks)

	73
	74
	75
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2	78-80
1	8-9
	10-11
	12

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	14
	15
	16

	17
--	----

	18
	19
	20-21

	22
	23

	24
--	----

	25
	26
	27-28

	29
--	----

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COMMENTS

37a. Had she EVER had a molar pregnancy? 0) no 1) yes 2) don't know

b. How long ago? _____

	30
31-32	

38. Was she ever told by a doctor, nurse, health worker or any other kind of medical or paramedical person that she had any kind of disease? 0) no 1) yes 2) don't know

Disease	Who told her (name)?	How long ago?
_____	_____	_____
_____	_____	_____
_____	_____	_____

	33
34-35	
36-37	
38-39	

39. Had she EVER had any kind of operation? 0) no 1) yes 2) don't know

Operation	Hospital name	How long ago?
_____	_____	_____
_____	_____	_____
_____	_____	_____

	40
41-42	
43-44	
45-46	

40a. During her last illness was she taking any drug or medicine? 0) no 1) yes 2) don't know

b. Where did she get the drug or medicine? 1) prescribed by doctor 2) over the counter 3) traditional medicine

c. What was the medicine?

May I have the bottle or packet please?

	47
	48
49	
50	
51	

41a. Is there anything else that you know about her illness or death that we have not covered here? 0) no 1) yes

b. What is that? _____

	52
--	----

42. Interviewer's assessment of the quality of data. 1) good 2) moderate 3) poor 4) can't tell

43. Interviewer's name: _____

	76
	77-78
3	1
	79-80

KKX110 5/80

4

MATERNAL DEATH FORM

Woman's name Date of birth
Age

Address
..... Marital status
.....
Occupation

Previous obstetric history Parity
Number of previous live births
Number of living children
Number of previous stillbirths

Other details:

Previous medical history.

If delivered: i. place of delivery
ii. date of delivery
iii. details of baby(s) live/stillborn
birthweight
sex M/F
apgar

Date of last menstrual period
Gestational age at delivery or death
Place of death Date of death
.....
.....

Ante-natal care

Clinic attended	Date of visit	Findings
1.		
2.		
3.		
4.		

Ante-natal care cont....

<u>Clinic attended</u>	<u>Date of visit</u>	<u>Findings</u>
5.		
6.		
7.		
8.		

Delivery care and/or circumstances surrounding death (eg. if admitted to hospital, time and date of admission, name of hospital, time(s) seen by midwife and doctor, details of examinations carried out - blood pressure readings, urine, physical examinations, etc, details of treatment given including medication and operations, time of death).

Diagnosis made

Cause of death as stated in notes or in other records (state source)

Source(s) of information (eg. casualty, in-patient docket; coroner's, police, post-mortem report; death certificate; or informant with report numbers).

5

SURVEY OF MATERNAL MORTALITY IN ANANTHAPUR
DISTRICT, ANDHRA PRADESH

PART - I

(Both for maternal mortality and controlled cases)

...

Date of interview :

Investigator's name :

Name of the respondent and
relationship to woman :

A. VILLAGE INFORMATION

1. Name :

2. Population :

3. Location : on the main road/interior

4. Subcentre :

5. PHC :

6. Nearest Town :

7. Distance from subcentre :

8. Condition of road to
subcentre : Mud/metalled/mixed

9. Usual mode of transport
to subcentre :

10. Distance from PHC :

11. Condition of road to PHC : Mud/metalled/mixed

12. Usual mode of transport to
PHC :

13. Distance from the nearest
town :

14. Condition of road to
nearest town : Mud/metalled/mixed

15. Usual mode of transport to nearest town :
16. Distance from nearest railway station :
17. Distance from nearest bus station :
18. Frequency of buses :
19. Post office in village : Yes/No
20. Educational institutions in the village : Primary school/High School/College/Any other specify
21. Electricity in the village : Yes/No
22. Health service providers
- Trained Dais :
- Untrained Dais :
- Traditional Practitioners :
- Allopathic practitioners :
- Any other specify :

B. HOUSEHOLD INFORMATION

23. No. of members in the household :
24. Type of family : Nuclear/Joint
25. Type of house : Pucca/Mixed/Kaccha
26. No. of rooms in the house :
27. Separate kitchen : Yes/No
28. Separate bathroom : Yes/No
29. Electricity in the house : Yes/No
30. Religion :
31. Caste :
32. Whether SC/ST : Yes/No
33. Amount of land owned : _____ acres
34. Relationship of head of household to woman :

35. Main occupation of head of household :
36. Place of work :
37. Educational level of head of household : Illiterate/Primary/High school/College/Any other (specify)
38. Radio/transistor in the house : Yes/No
39. Do any members of the household read newspapers/periodicals : Regularly/Occasionally/None
40. Do you know where the nearest subcentre is? : Identified correctly/incorrectly/Don't know
41. Have you or any other members of your household ever been to the subcentre? : Yes/No/Don't know
42. If no, to Q.41, ask why not?

Verbatim:

English translation:

43. If yes, to Q.41, ask where your needs satisfied by the visit? : Yes/No/Don't know

44. If not satisfied i.e. No. to Q.41, ask the respondent to give response:

Verbatim:

English translation:

45. Have you or any other members of your household ever been to PHC? : Yes/No/Don't know
46. If no. to Q.45, ask why?

Verbatim:

English translation:

47. If yes to Q.45 ask where your needs satisfied, by the visit? : Yes/No/Don't know
48. If not satisfied i.e. No. to Q.45, ask the respondent to give reasons:

Verbatim:

English translation:

49. Have you or any other members of your household ever been to a govt. dispensary or hospital? : Yes/No/Don't know
50. If no. to Q.49, ask why?

Verbatim:

English translation:

51. Do you know when the male health
worker visit your household
last? : Yes/No
52. If yes, when and for what
purposes? :

Verbatim:

English Translation:

53. Do you know when the female
health worker visit your
household last? : Yes/No
54. If yes, when and for what
purposes? :

Verbatim:

English translation:

55. Where do the family members go
for treatment if any one
falls sick? :
56. Where do the family members go
for marketing and how often? :
57. Are any family members work in
a town or city? : Yes/No

C. INFORMATION ABOUT WOMAN:

58. Age :
59. Educational level : Illiterate/Primary
school/High school/
College/Any other
(specify)
60. Occupation (previous if
deceased) :
61. Age at marriage :
62. Husband's age :
63. Husband's educational level : Illiterate/Primary
school/High school/
College/any other
(specify)
64. Husband's occupation :
65. Place of work :
66. (Next page) :

66. Pregnancy History:

Preg- nancy Order	Outcome of preg- nancy live birth/still birth/spon- taneous abortion/ induced abortion	Date of birth/ loss	Month of women's pregnancy when birth or loss occurred	Sex of child if born alive	Type of birth single/ twin/ triplet	Child still living yes/ no.	If no, age at death	If yes, corr- ect age	Place of preg- nancy termi- nation home/ PHC/ hospi- tal etc.	Who at- tend- ed at deli- very Dal/ LHV/ or Doctor	Any pro- blem during preg- nancy or deli- very
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1

2

3

4

5

67. Problems during pregnancy:

<u>Pregnancy</u> <u>order</u>	<u>Type of problem and what was done?</u>
----------------------------------	---

Verbatim:

English translation:

Verbatim:

English translation:

Pregnancy
order

Type of problem and what was done?

Verbatim:

English translation:

Verbatim:

English translation:

68. Was the woman registered for antenatal care during last pregnancy? : Yes/No/don't know
69. If yes at what stage of pregnancy? : _____ months

70. If no, reasons for not registering:

Verbatim:

English translation:

71. No. of visits made to subcentre/
PHC for antenatal care :

72. If not visited even once reasons
for not visiting :

Verbatim:

English translation:

73. Did any health worker visit home
of the woman during antenatal
period? : Yes/No/Don't know

74. If yes, how many times? :

75. During the last pregnancy, did
the woman ask any one for
advise of help about her last
pregnancy before delivery? : Yes/No/Don't know

76. If yes, from whom the advise was sought? :
77. How many months pregnant the woman was when the advise or help was sought? :
78. Why the advise or help was sought? :

Verbatim:

English translation:

79. If yes, who provided the care and no. of times the care was provided :
80. Were there any complications during the pregnancy and what was done? Give details.

Verbatim:

English translation:

81. Did the woman suffer from any of the following diseases during the last pregnancy?
- a) Anemia : Yes/No/don't know
 - b) Heart disease : Yes/No/don't know
 - c) Diabetes : Yes/No/don't know
 - d) High blood pressure : Yes/No/don't know
 - e) Urinary tract infection : Yes/No/don't know
 - f) Asthma : Yes/No/don't know
 - g) Jaundice : Yes/No/don't know
 - h) Lung disease (TB etc.) : Yes/No/don't know
 - i) Malaria : Yes/No/don't know
 - j) Peptic ulcer : Yes/No/don't know
 - k) Liver disorders : Yes/No/don't know
 - l) Any other disease (specify) : Yes/No/don't know
82. Which of the following symptoms or signs occur during the last pregnancy?
- a) Excessive vaginal bleeding : Yes/No/don't know
 - b) High fever : Yes/No/don't know
 - c) Eclamptic fits : Yes/No/don't know
 - d) Any other (specify) : Yes/No/don't know
83. Place of pregnancy termination • : Home/PHC/Hospital/
Other health institution (specify)/
Other
84. Who assisted the pregnancy termination : Nobody/relative/
neighbour/trained dai/
untrained dai/ANM/
LHV/Govt. Doctor/
Private Practitioner/
Others (specify)

PART - II

(For only maternal mortality cases)

1. Date of death :
2. Month of pregnancy :
3. At what stage the death occurred :
 - (a) Before the start of labour pains
 - (b) After the start of labour pains but before the baby was delivered
 - (c) After the delivery of baby.
4. If the child was actually delivered, indicate time between onset of labour and delivery of child :
5. If death occurred after the baby was delivered, indicate the number of days between delivery and date of death :
6. Place of death : Home/Transit/Government hospital/Private hospital/PHC/Any other (specify)
7. If death occurred at home, why the woman was not taken to the hospital before death for treatment. Give detailed reasons :

Verbatim:

English translation:

8. If death occurred in the hospital indicate the condition of the woman at the time of taking her to the hospital :

Verbatim:

English translation:

9. What mode of transport was used to take her to the hospital? :
10. Who accompanied the woman to the hospital? :
11. How many days the woman stayed in the hospital before her death? :
12. Did anybody advise that the woman be taken to the hospital? : Yes/No/don't know
13. If yes, who? :
14. If death occurred at home who attended at the delivery? : (a) Untrained Dai
(b) Trained Dai
(c) Relative
(d) Neighbour
(e) ANM
(f) LHV
(g) Pvt. Doctor
(h) Govt. Doctor
(i) Any other (specify)

15. Did the person attending at the delivery tell the family about the seriousness of the patient's condition? : Yes/No/don't know
16. If yes, what was told and what suggestion were made? :

Verbatim:

English translation:

17. Was any worker from the sub-centre/FHC called to attend to emergency? : yes/No/don't know
18. If yes, who was called? :
19. If no, indicate the reasons :

Verbatim:

English translation:

20. What were symptoms of the patient before her death? Probe about chills, fever, cramps, oedema, offensive odour etc.

Verbatim:

English translation:

21. What do you think were the main causes of death?
- (a) spontaneous abortion
 - (b) Induced abortion
 - (c) Haemorrhage before delivery
 - (d) Haemorrhage after delivery
 - (e) Retained placenta
 - (f) Ruptured uterus
 - (g) R Sepsis
 - (h) Eclampsia
 - (i) Tetnus
 - (j) Any other (specify)

22. Do you think any pre-existing illness of the woman complicated the delivery and caused her death? If yes, give details.

Verbatim:

English translation: