

Principal Investigator Md. Shahidullah

Application No. 91-012

Title of Study Maternal Mortality in Matlab, Bangladesh

Trainee Investigator (if any) _____

Supporting Agency (if Non-ICDDR,B) Australian National University & ICDDR,B

Project status:

- ☒ New Study
☐ Continuation with change
☐ No change (do not fill out rest of form)

Circle the appropriate answer to each of the following (If Not Applicable write NA).

1. Source of Population:

- (a) Ill subjects Yes ☐ No ☐
(b) Non-ill subjects Yes ☐ No ☐
(c) Minors or persons under guardianship NA Yes ☐ No ☐

2. Does the study involve:

- (a) Physical risks to the subjects Yes ☐ No ☐
(b) Social Risks Yes ☐ No ☐
(c) Psychological risks to subjects Yes ☐ No ☐
(d) Discomfort to subjects Yes ☐ No ☐
(e) Invasion of privacy Yes ☐ No ☐
(f) Disclosure of information damaging to subject or others Yes ☐ No ☐

3. Does the study involve:

- (a) Use of records, (hospital, medical, death, birth or other) Yes ☐ No ☐
(b) Use of fetal tissue or abortus Yes ☐ No ☐
(c) Use of organs or body fluids Yes ☐ No ☐

4. Are subjects clearly informed about:

- (a) Nature and purposes of study Yes ☐ No ☐
(b) Procedures to be followed including alternatives used Yes ☐ No ☐
(c) Physical risks NA Yes ☐ No ☐
(d) Sensitive questions Yes ☐ No ☐
(e) Benefits to be derived Yes ☐ No ☐
(f) Right to refuse to participate or to withdraw from study Yes ☐ No ☐
(g) Confidential handling of data Yes ☐ No ☐
(h) Compensation &/or treatment where there are risks or privacy is involved in any particular procedure NA Yes ☐ No ☐

5. Will signed consent form be required:

- (a) From subjects Yes ☐ No ☐
(b) From parent or guardian (if subjects are minors) Yes ☐ No ☐

6. Will precautions be taken to protect anonymity of subjects NA Yes ☐ No ☐

7. Check documents being submitted herewith to Committee:

- ☐ Umbrella proposal - Initially submit an overview (all other requirements will be submitted with individual studies).
☒ Protocol (Required)
☒ Abstract Summary (Required)
☒ Statement given or read to subjects on nature of study, risks, types of questions to be asked, and right to refuse to participate or withdraw (Required)
☒ Informed consent form for subjects
☒ Informed consent form for parent or guardian
☒ Procedure for maintaining confidentiality

Questionnaire or interview schedule *

* If the final instrument is not completed prior to review, the following information should be included in the abstract summary:

1. A description of the areas to be covered in the questionnaire or interview which could be considered either sensitive or which would constitute an invasion of privacy.
2. Examples of the type of specific questions to be asked in the sensitive areas.
3. An indication as to when the questionnaire will be presented to the Cttee. for review.

I agree to obtain approval of the Ethical Review Committee for any changes involving the rights and welfare of subjects before making such change.

Shahidullah

Principal Investigator

Trainee

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Research Protocol

91-011
18.8.91

1. Principal Investigator : Md. Shahidullah
2. Other Investigator : None
3. Title : Maternal Mortality in Matlab, Bangladesh
4. Starting date : September 15, 1991
5. Completion date : December 31, 1993
6. Total direct budget : 144,000.00 taka
7. Funding source : Demography dept. and its child survival project of the Australian National University (ANU)
8. Scientific division : Population Science and Extension (PS&E)

This protocol has been approved by the scientific division head.

Signature of the Scientific Division Head:

Date:

John G Haug (acting)
18 Aug 91

9. Aims of project

a. Abstract summary

This study will test the applicability, reliability and expandability of the 'Sisterhood Method', a newly developed indirect method for providing a community-based estimate of the level of maternal mortality. This method seems to have a special relevance to developing countries where the alternative data sources and approaches to estimation are often inadequate and inappropriate. Until recently, only a few field studies have been undertaken to test the applicability of the method. However, applications of this method, so far, have been limited to estimating the level of maternal mortality and have thus ignored many other important aspects. This study will test what else and how reliably this method can tell us about maternal deaths and give emphasize on the specific aims mentioned in section 9(b). The validation test will be carried out in Matlab DSS area; this will provide an opportunity to evaluate whether the information obtained by this method can be cross validated by the information recorded in the DSS.

For the validation of the method, each respondent will be asked whether any of his/her sisters has died due to maternity related

causes. When a respondent reports about a maternal death, additional questions will be asked of that respondent to collect information about timing of death relating to pregnancy/delivery, place of and assistance during delivery, history of any complications in the present and previous delivery, and the presence of any medical disorder. Finally, some specific symptoms based questions will also be asked to investigate causes of maternal deaths.

b. Specific aims

1. To know what percentage and what type(s) of all known maternal deaths which occurred in Matlab DSS area during 1976-90 can be identified by the sisterhood method.
2. To know whether there is a significant time related recall bias in reporting maternal deaths.
3. To know how reliable will the cause of death information collected by this method be.
4. To know how reliably this method can tell us about sociodemographic characteristics of women who have experienced maternal deaths.
5. To know who are the better respondents: sisters or brothers of the deceased women.
6. To know the characteristics of respondents that affect reliability of reporting of maternal deaths and circumstances that caused/leading to death.

c. Significance

Undoubtedly, maternal mortality studies are now on the frontline in demographic and public health related research. Researchers, health professionals and policy makers have started to give serious considerations to the reduction of maternal mortality. As a result, the reduction of maternal mortality has now become a high priority for the strategies for 'health for all by the year 200'. A 'call to action' has been made as part of the 'safe mother initiative'. But a major constraint on this action in the developing world is lack of reliable information. This problem can be reduced/overcome if the sisterhood method can produce reliable estimates of maternal mortality. The validation test of the sisterhood method in Matlab DSS area as will be attempted in this protocol will provide valuable information regarding reliability of the method. The choice of Matlab DSS area for the validation test has a special significance. The availability of unique vital registration data base in Matlab DSS area makes it one of the few highly appropriate places in the world for the validation of the method.

10. Ethical implications

Some of the questions in this study may be sensitive to some respondents. The study, however, does not include any physical, social and psychological risks to respondents.

11. Research Plan

11.1 Background

Researchers and health professionals involved in the areas of maternal and child health in the developing world during most of the second half of this century, have been concerned primarily with the health problems of infants and young children. Although it has been recognized for many years that maternal mortality rates are distressingly high in rural areas, as well as in the urban slums, of most developing countries, investigators have not studied the health problems of mothers as much as the health problems of offspring. This fact is demonstrated by a far greater number of reports published on fetal, infant and child health than on maternal health (Buchanan, 1975: 129). Perhaps this relative lack of attention to the field of maternal health and mortality was the reason why Rosenfield and Maine (1985) asked 'where the M is in MCH?'. It is difficult to understand why maternal mortality receives little serious attention from health professionals and policy makers in the past. It may be partly due to the difficulties involved with the study of maternal mortality.

The most apparent problems in the study of maternal mortality in developing countries are the extreme paucity of data and the underreporting of maternal deaths. An accurate classification of maternal deaths by cause is required to estimate the level of maternal mortality, since reproductive complications are one of the many causes of death among women of reproductive age. It is probable that a great majority of women who die in many countries never manage to reach a hospital, particularly those who live in under-served rural areas. No cause of death is available for those deaths; this poses a serious problem in the study of maternal mortality.

An assessment of the magnitude of the maternal mortality problem remains difficult as maternal death in all settings is a relatively rare event, particularly if compared with childhood death, even when the mortality level is high (Boerma, 1987: 213; Rosenfield, 1989: 377; Trussell and Pebley, 1984: 267; Koenig et al., 1988: 70). For example, in a rural setting of Bangladesh where both fertility and mortality is quite high, Chen et al. (1974: 335) report a maternal mortality ratio of 5.7 deaths per 1000 live births, while by contrast, the infant mortality rate for the same period was 124 deaths per 1000 live births; this suggests that studies of such rare events require an extremely large study population and accurate reporting.

Due to the lack of community-based data, most published reports on maternal deaths in developing countries come from hospital studies and these obviously are limited to data on complicated and serious cases which are more likely to be hospitalized. In many developing countries, hospitals - the formal health care facilities - are located in the larger urban areas and are accessible to only a very small percentage of the total population. Hospital-based maternal deaths are, therefore, subject to selective bias and are unlikely to be representative of the population at large (Trussell and Pebley, 1984: 270; Rosenfield, 1989: 377; Koenig et al., 1988: 70).

Vital registration, which usually provides estimates of mortality levels and their determinants, is virtually non-existent in Bangladesh. This non-existence is the cause of an extreme paucity of research data on maternal mortality in Bangladesh outside the Demographic Surveillance System (DSS), Matlab. As in other developing countries, whatever data are available in Bangladesh are limited by their urban orientation, small sample sizes, and the selectivity of hospital admission.

Because of the limitations of indirect methods of estimating adult mortality, the demographic world has not witnessed many maternal mortality studies using indirect methods. Due to the lack of reliable indirect methods and other difficulties involved with the study of maternal mortality, even a crude estimate of maternal mortality is lacking in many developing countries (Graham et al., 1989: 131; Bhatia, 1988: 1). Recently the 'Sisterhood Method' - an indirect method of estimating maternal mortality - has been developed. Drawing on the knowledge of model fertility and mortality distributions, a simple procedure was devised for converting the proportions of sisters dying of pregnancy-related causes reported by adults during a community census or survey into conventional measures of mortality (Graham and Brass, 1988). This method seems to have a special relevance to developing countries where the alternative data sources and approaches to estimation are often inadequate and inappropriate (Graham et al., 1989: 125). A detailed account of the Sisterhood Method is given elsewhere (Graham and Brass, 1988; Graham et al., 1989); this includes the justification for selecting siblings to ask about the survival status of their sisters rather than children with respect to their mothers or husbands concerning their (first) wife. Possibly the most persuasive of these is the sample size implications. As a recent addition to the array of indirect techniques for estimating maternal mortality, the Sisterhood Method is still at a comparatively early stage in its evaluation. There is a need for replication of this method to test its applicability and reliability and also for its further refinements and adaptations. If this method produces reliable estimates of maternal mortality, it will reduce the data constraint imposed on the effective planning, management and evaluation of programs aimed at reducing maternal mortality in the developing countries.

Until recently, only a few field studies have been undertaken to test the applicability of this method and reported that the estimate of the level of mortality obtained by this method is very much in line with that obtained from direct registration of deaths (Graham et al., 1988; Graham et al., 1989; Graham, 1990). This suggests that there is a considerable promise in the use of this method. However, applications of this method, so far, have been limited to estimating the level of maternal mortality. For the success of the method through its wider application it is worth exploring what else and how reliably the Sisterhood Method can tell us about maternal deaths.

Some of the major issues to be researched are: what percentage and what type(s) of all known maternal deaths which occurred in a community can be identified by this method? What are the characteristics of sisters that affect reliability? How far back in time it is possible to obtain reliable information about maternal deaths? Would reliability, for example, be greater for the deaths that occurred within 5 years before the survey than for the deaths that occurred within 6-10 years before the survey? How reliably can this method identify risk factors related to pregnancy/delivery? How reliable will the cause of death information collected by the method be? All these questions remained unaddressed and need detailed investigation. Giving special emphasize on all these issues, the present study proposes to test the reliability, applicability and expandibility of the 'Sisterhood Method' in Matlab DSS area; this will provide an opportunity to evaluate the Sisterhood Method in relation to deaths recorded by continuous vital registration.

11.2 Rationale

Due to the lack of community-based maternal mortality data and other difficulties involved with the study of maternal mortality, even a crude estimate of level of maternal mortality is lacking in many developing countries. This poses a serious threat to the planning, management and evaluation of intervention programs aimed at reducing maternal mortality and the judicious allocation of scarce resources in developing countries.

This problem can not, however, be dealt with effectively in developing countries until many unaddressed and hence unanswered questions including level, causes and differentials of causes of maternal mortality are known. Currently in Bangladesh, like in other developing countries, an information vacuum surrounds questions about maternity-related deaths. In such a situation, the test of validation of the sisterhood method as will be attempted in this protocol be regarded as highly timely, appropriate and valuable. If the validation test appears to be a fairly accurate one, then this study will supply not only Bangladesh but also the entire developing world with essential tools with which to reduce the data constraint imposed on the effective planning, management and evaluation of programs aimed at reducing maternal mortality.

11.3 Materials and Methods

The present study proposes to collect data to test the applicability, reliability and expandibility of the Sisterhood Method. In order to estimate the level of maternal mortality by this method, it is necessary to ask the following four questions to the selected individuals directly:

- Q(i) How many sisters (born to the same mother) have you ever had who were ever-married (including those who are now dead)?
- Q(ii) How many of these ever-married sisters are alive now?
- Q(iii) How many of these ever-married sisters are dead?
- Q(iv) How many of these dead sisters died during
 - pregnancy
 - childbirth
 - the six weeks after the end of pregnancy

Information from Q(i) and Q(iv) together with the five-year age group of the respondent will provide the basic data required for the Sisterhood Method for estimating maternal mortality. However, information from the other two questions can be used as a means of cross-checking with the two essential items as well as aids to memory recall (Graham et al., 1989: 128). Looking at the questions it seems that the data requirements are simple and can be obtained with a few minutes of interviewing time.

While the simplicity of the sisterhood approach is an advantage in many respects, the rarity of the event of interest - maternal death - makes the actual data collection procedure a little difficult. Although the number of maternal deaths are expected to be obtained by interviewing living sisters depend on the actual level of maternal mortality in a community, evidences obtained from the reports of the application of the method suggest that quite a large number of individuals needs to be interviewed to obtain a reasonable number of deaths to be analysed. For example, 116 maternal deaths were obtained by interviewing 9037 individuals in a field study of the Sisterhood Method in Bolivia in 1989, where the level of maternal mortality was 373 per 100,000 live births according to direct registration of deaths. Planning and management of interview of such a huge number of individuals can place an investigator on a considerable pressure especially when there are time and money constraints. Fortunately in the present study, such pressure can be minimized to a great extent because of the availability of the unique vital registration data base in the study area. This data base will provide an opportunity to formulate the design of the field study in a way that will make the data collection easier, quicker and also cost effective.

800 respondents, taken from three different groups, will constitute the sample of this study. In the first group, respondents will come from households that have experienced maternal deaths during the 15-year period from 1976-90. The study will first identify households that have experienced maternal deaths within this period. Second, an attempt will be made to identify one adult living brother and one adult living sister aged 15 years or over of each of the deceased woman. Finally, the identified living brothers and sisters will be interviewed to report about their sisters death.

A previous maternal mortality study (Koenig et al., 1988:69) conducted in Matlab identified 387 maternal deaths (including violent/concomitant causes) for the 10-year period from 1976-85. After 1976-85, there has been no special intervention in Matlab for the reduction of maternal deaths. Hence it can safely be assumed that there would be approximately 550 maternal deaths (37 maternal deaths per year) during the 15-year period from 1976-90. Since intra-village marriages are common in rural Bangladesh, it is expected that the parental residence of more than 60 per cent of the deceased women will be within the DSS area. This will help to identify their parental households and also their siblings from the DSS area. 200 such households, each consisting of one adult living brother and one adult living sister of the deceased woman, will be selected. Thus this group will contribute 400 respondents (200 brothers and 200 sisters) to the total sample. In selecting respondents, consideration will be given to their age so that brothers and sisters closer in age to their deceased sisters will get selected. The reason for taking both brother and sister is to test whether they are equally knowledgeable about their sister's death and circumstances that caused/leading to death.

The second group of sample will come from households that have experienced deaths due to non-maternal related causes among women of reproductive age during 1976-90. 100 such households, each consisting of one adult living brother and one adult living sister of the deceased woman, will be selected. The contribution of this group of respondents to the total sample will be 200 (100 brothers and 100 sisters of 100 deceased women). The reasons for taking 100 non-maternal deaths are to know whether both maternal and non-maternal deaths are equally remembered by siblings of the deceased and also to verify whether there is any misclassification of causes of death recorded by either the DSS or the sisterhood method. It is worth noting here that both in the first and the second groups, selected brothers will be interviewed separately from the selected sisters.

In the third group, 200 adult women, who are not identified as having a sister who died either maternal or non-maternal related causes, will also be selected for interview. These women will be included into the sample to keep the interviewers blind about both maternal and non-maternal deaths which will help to minimize interviewer's bias.

Once the respondents are identified, a list of DSS identification numbers of the selected individuals, along with other necessary information such as name, father's /husband's name, age, sex and religion will be sent to the field. The information on age, sex and religion along with other socioeconomic information of respondents will be used to study the characteristics that affect reliability of their reporting of number and cause of maternal death. The interviewers will be instructed to gather information by asking questions to the selected respondents directly and to make three calls before rejecting an individual from interview list. If any selected individual is rejected in this way, then an attempt will be made to select another individual from the same village.

The interviews will be conducted with a structured questionnaire. The four basic questions of the Sisterhood Method will be asked to each respondent. Information obtained from question 4 will provide basic data required for testing the reliability of siblings reporting of maternal deaths. This can also be used to calculate the recall dropout rate, if any, and to know whether recall dropout rate increases as year of death goes back in time from survey date. When a respondent reports about a maternal death, additional questions will be asked of that respondent to get detailed information about the dead woman and the circumstances that caused/leading her to death. Basic pregnancy history information such as number of living children, miscarriages, stillbirths, and abortion will be collected. Information will be collected about timing of death relating to pregnancy/delivery; place of and assistance during delivery. The interviews will also gather information about history of any complications in the present, and previous pregnancy; and the presence of a medical disorder. In addition to that some questions will be asked to assess socioeconomic status of the deceased husband's household. All these information along with maternal age will be used to study the distribution of sociodemographic characteristics of the deceased women. Finally, information related to cause of death will also be collected by asking some specific symptoms based questions to each respondent. Cause of death will then be determined using well-defined algorithms of symptoms and signs. The cause of death determined in this way will then be compared with the cause of death recorded in the DSS data file to test the reliability of sibling's reporting of cause of death.

In this study, data will be collected by asking questions to ever-married women only. The reasons for restricting the questions to ever-married women are that the population in Matlab, as in other parts of the country, is predominantly Muslim and the incidence of birth outside wedlock is very rare. In such a situation it is not appropriate to ask questions about pregnancy-related deaths among unmarried women. However, this is a group known to be under-represented in maternal mortality studies.

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Due to the prevailing cultural situation in the Matlab study area, which is not congenial for male strangers to collect such information by interacting with women, it is thought that the best strategy is to use female interviewers. Three female university graduates will be recruited and trained to collect data for this study.

In this study, special consideration will be given to minimize interviewer's bias. In doing so, the following measures will be taken: selection of respondents from three different groups rather than only from maternal deaths; random allocation of interviews by the investigator; and arrangement of interview schedule in such a way that interviewers will not have any chance to ask community health workers about maternal deaths.

For the validation of the Sisterhood Method, the following variables will be collected by interviewing selected living siblings of deceased women:

Information about deceased women:

Education

Pregnancy history

Timing of death relating to pregnancy/delivery

Place of and assistance during delivery

Complications in any pregnancy

Presence of any medical disorder

Cause of death - based on specific symptoms related questions

Information about respondents:

Education

Age

Sex

parity

religion

Position in family relative to deceased (older or younger)

Closeness to deceased sister (whether they see each other regularly)

Whether s/he was present during sister's problem

11.4 Benefits to be derived

No direct benefits to respondents: will provide valuable information regarding reliability of the Sisterhood method and hence contribute to the existing knowledge of demographic literature.

11.5 Confidentiality

DSS identifying information such as name and registration numbers will be appeared on the questionnaire forms. This information will be used only for identifying individuals and hence can not be deleted. However, the staff who will have access to these questionnaires will be taught about the confidential nature of the information.

The interviews will be conducted in absence of any other person. The interviewers will not let anyone in the household know of the maternal death. After the individuals are interviewed, all completed questionnaires will be stored in a safe place at the ICDDR,B. Under no circumstances will these information be disseminated to any individual or to any agency. All analysis will be done using aggregate information. There will be no way that individuals can be identified.

11.6 Collaborative arrangements

This will be a collaborative study of the demographic department and its child survival project of the Australian National University and the MCH-FP Extension Project of the ICDDR,B. The field work is a component of a three year doctoral program for which the principal investigator has enrolled at the ANU. The data analysis and the writing of the dissertation will be carried out at the ANU during 1992-93.

REFERENCES

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12. Time frame

Sl. No.	Type of work	Starting date	Completion date
1.	Field work	Sept.15, 1991	Dec.15, 1991
2.	Analysis & writing	Dec.20, 1991	Dec.31, 1993

13. Budget for field work

13.1 Detailed budget

1. Personnel Services

Position	No. of persons	No. of men months	% effort	Monthly salary in taka	Project requirement in taka
Field Supervisor	1	3	100	10,000	30,000
Interviewer	3	3	100	6,000	54,000
Data entry tec.	1	1	Support from MCH-FP		
Sub Total					84,000

2. Travel and Transportation (for myself)

Dhaka - Matlab - Dhaka ICDDR,B support

3. House rent

House rent in Matlab for 3 months 12,000

4. Printing and Reproduction

Printing of questionnaires 20,000

5. Stationary 3,000

6. Transportation to the field 15,000

7. Incidental Cost 10,000

Total: 144,000

13.2 Summary Budget

Category	Project requirement in taka
1. Personnel	84,000
2. Travel from and to Canberra	Support from ANU
3. House rent	12,000
4. Printing and reproduction	20,000
5. Stationary	3,000
6. Transportation to the field	15,000
8. Incidental cost	10,000
Total	144,000

Verbal consent form

The International Centre for Diarrhoeal Disease Research, Bangladesh is planning to collect information on women's health during pregnancy and delivery. Some questions regarding pregnancy/delivery may be sensitive. You will have the right to refuse to answer questions at any time. The interview process will take approximately 30 minutes. The information supplied by you will be used for research only and be treated as confidential.

Please note that you will not be paid. If you have any questions we will try to answer them. Do you have any questions now?

Do you agree to participate?

Maternal Mortality in Matlab, Bangladesh

Introduction

It has been recognized for many years that maternal mortality rates are distressingly high in rural areas, as well as in the urban slums, of most developing countries. But evidence accumulated over the years from both developed and developing countries shows that investigators have not studied the health problems of mothers as much as the health problems of offspring. It may be partly due to the difficulties involved with the study of maternal mortality.

Vital registration, which usually provides estimates of mortality levels and their determinants, is lacking in many developing countries. This is the cause of an extreme paucity of research data on maternal mortality in developing countries. Another problem in the study of maternal mortality is maternal death itself. Maternal death is a relatively rare event, for which it is necessary to study an extremely large population to obtain a reasonable number of maternal deaths to be analysed. Because of all these, direct measurement of maternal mortality is difficult. To reduce/overcome the problem of measuring maternal mortality, demographers have turned their attentions towards its indirect measurement and came up with the 'Sisterhood Method'.

What is the Sisterhood Method ?

Sisterhood Method is a newly developed (by Graham and Brass in late 1987) indirect method for providing a community-based estimate of the level of maternal mortality in a relatively simple and inexpensive way. Drawing on the knowledge of model fertility and mortality distributions, this method converts the proportions of sisters dying of pregnancy-related causes reported by adults during a community census or survey into conventional measures of mortality .

Field studies of the method suggest that this method seems to have a special relevance to developing countries where the alternative data sources are often inadequate and inappropriate. Applications of this method, so far, have been limited to estimating the level of maternal mortality and have thus ignored many other important aspects. It is worth exploring what else and how reliably the Sisterhood Method can tell us about maternal deaths.

This study proposes to test the applicability, reliability and expandibility of the Sisterhood Method in Matlab DSS area; this will provide an opportunity to evaluate the method in relation to deaths obtained from continuous vital registration.

Specific aims

1. To know what percentage and what type(s) of all known maternal deaths which occurred in Matlab DSS area during 1976-90 can be identified by the sisterhood method.
2. To know whether there is a significant time related recall bias in reporting maternal deaths.
3. To know how reliable will the cause of death information collected by this method be.
4. To know how reliably this method can tell us about sociodemographic characteristics of women who have experienced maternal deaths.
5. To know who are the better respondents: sisters or brothers of the deceased women.
6. To know the characteristics of respondents that affect reliability of reporting of maternal deaths and circumstances that caused/leading to death.

Data and Sample

Data source : A field survey will be conducted in Matlab DSS area to collect data for this study.

Study period : 15 years from 1976-90

Sample size : 800

Sampling

800 respondents, taken from three different groups, will constitute the sample of this study. In the first group, 200 such maternal deaths will be selected so that one adult living brother and one adult living sister aged 15 years or over of each of the deceased woman could be identified from the DSS area. Thus this group will contribute 400 respondents (200 brothers and 200 sisters) to the total sample. The reason for taking both brother and sister is to test whether they are equally knowledgeable about their sister's death and circumstances that caused/leading to death.

In the second group, 100 such non-maternal deaths among women of reproductive age during 1976-90 will be selected so that one adult living brother and one adult living sister of each of the deceased woman could be identified from the DSS area. The contribution of this group of respondents to the total sample will be 200 (100 brothers and 100 sisters of 100 deceased women).

The reasons for taking 100 non-maternal deaths are to know whether both maternal and non-maternal deaths are equally remembered by siblings of the deceased and also to verify whether there is any misclassification of causes of death recorded by either the DSS or the sisterhood method. In the first and the second groups, selected brothers will be interviewed separately from the selected sisters.

In the third group, 200 adult women, who are not identified as having a sister who died either maternal or non-maternal related causes, will also be selected for interview. These women will be included into the sample to keep the interviewers blind about both maternal and non-maternal deaths which will help to minimize interviewer's bias.

Information to be collected

About deceased women

Education
Pregnancy history
Place of death
Timing of death relating to pregnancy/delivery
Place of and assistance during delivery
Complications in any pregnancy
Presence of any medical disorder
Cause of death - based on specific symptoms related questions

About respondents

Education
Age
Sex
Pregnancy history
Religion
Position in family relative to deceased (older or younger)
Closeness to deceased sister (whether they saw each other regularly)
Whether s/he was present during sister's problem