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National Maternal Mortality Study

Findings and Conclusions

Egypt, 1992-1993



Ministry of Health
Child Survival Project
In Cooperation with USAID



**National Maternal
Mortality Study: Egypt,
1992-1993**

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B.

Foreword

The National Maternal Mortality Study: Egypt, 1992-1993 is the first national study of maternal mortality to take place in Egypt. It was conducted by the Child Survival Project of the Ministry of Health, with help from the Central Agency for Public Mobilization and Statistics (CAPMAS). The study was funded by the Ministry of Health and the United States Agency for International Development (USAID), with financial support for some technical assistance provided by the British Overseas Development Administration (ODA). Technical support was provided by Clark Atlanta University.

The immense effort put into designing this study, with the help of national and international experts, make it unique in its accuracy and teaching value. It is also unique because the research was conducted by over 150 Ministry of Health doctors in 21 governorates and is the largest study of maternal mortality in a developing country.

This preliminary report provides the major findings of the National Maternal Mortality Study: Egypt, 1992-1993 in an abbreviated form. It summarizes the trends of maternal mortality and the major causes of maternal death in Egypt. More importantly, it examines the avoidable factors that contributed to these deaths, so that preventive programs can be designed and implemented.

We are grateful to the research team and the study contributors for their serious and sincere efforts. We look forward to implementing their practical recommendations and developing new programs to reduce maternal mortality in Egypt.

 *Prof. Dr. Aly Abdel Fattah*
Minister of Health, Egypt

Acknowledgments

In conducting and presenting the National Maternal Mortality Study: Egypt, 1992–1993, we gratefully acknowledge the continuous support and encouragement of two Ministers of Health. This study was initiated at the request of the former Minister of Health, his Excellency Dr. Rageb Dwidar. Our current minister, his Excellency Dr. A. Abdel-Fattah, has made possible the publication of the findings and has encouraged and promoted efforts to identify solutions to the problem of maternal mortality. We have also been fortunate to obtain the support of the Undersecretaries of Health, Dr. Nabil Nassar and Dr. Moushira El-Shafie.

A major study such as this is only possible through the help and collaboration of many people. We would like to express our thanks to all those whose great efforts and excellent work ensured the success and accuracy of the study. We would also like to thank the families of the deceased women who agreed to participate in our study, and who gave us information so we can try to prevent future deaths.

The first-rate assistance given by the Central Agency for Public Mobilization and Statistics (CAPMAS) in collecting household data under the supervision of Dr. Botheina El-Deeb and the president of CAPMAS, General Farouk Abdel-Azeem, is greatly appreciated. Help in designing the sample was also received from Mr. Fangari and from Dr. Nagla Adley of CAPMAS. We thank all of the CAPMAS team for a successful collaboration.

The study was made possible by the work of a Central Advisory Group and 21 Local Advisory Groups, from each governorate, who supplied the detailed records and reports of maternal deaths. Particular thanks are owed to the consultant obstetricians who determined the causes of maternal deaths. We are also grateful to the 122 Selected Health Bureau Directors who formed the backbone of the study and notified us of female deaths. Members of the research team who collaborated in the study are shown in Appendix 1.

The financial support from the United States Agency for International Development (USAID) is most appreciated. The late Dr. Michael White was instrumental in supporting the start of the study, and the continued encouragement of Dr. Joy Riggs Perla, Dr. Nahid Matta, Mr. Felix Awantang, and Dr. Francisco Zamorra has seen it through to completion. Clark Atlanta University has provided continued technical support throughout the study, and the help of Dr. Frank Cummings, Dr. Reginald Gipson, and Mr. Albert Baron is greatly appreciated. The financial support contributed by the British Overseas Development Administration (ODA) for the consultancies of Dr. Oona Campbell, Mr. Tom Marshall, and Dr. Carine Ronsmans is also gratefully acknowledged.

National and international consultants provided invaluable advice as well. Among these are Prof. Mahmoud Fathalla, Director of Research in Human Reproduction, WHO; Dr. Judith Fortney, Maternal and Child Health Consultant, WHO; Prof. V. Tindall, Vice President of the Royal College of Obstetricians & Gynaecologists (RCOG) and the author of *The Confidential Enquiry into Maternal Mortality for England and Wales*; Dr. N. Patel, Honorary Secretary of RCOG; Prof. Mohammed Hassan, Cairo University; Dr. Saneya Saleh, American University in Cairo; and Mr. J. Virjy Peavey, Senior Training Consultant, Public Health Practice Program Office, U.S. Centers for Disease Control.

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Many thanks are due to the administration team at the Child Survival Project, headed by Mr. Ahmed El-Labany. Special thanks to Ms. Dalida Samir, who helped in the preparation of the questionnaires and the report, and who facilitated much of the administration of the study. Numerous implementation officers were involved in the study, including Dr. Moharram Khalefa, Dr. Amina Loutfy, Dr. Ibrahim El-Nekely, Dr. Alaa Abdel-Halim, Dr. Ashraf Nabil Essa, Dr. Yehia Hassan, Dr. Abdel-Fattah Mohammed, Dr. Ali Abdel-Satar Bayoumi, Dr. Ali Ali Megahed, Dr. Farag Mohammed Moftah, and Dr. Mahmoud Abdel-Fatah. Thanks also for the help of Ms. Shireen Mohammed Mahmoud, Ms. Omeima Bakry Abou El-Souad, Mr. Mohie El-Khatib, Ms. Soraya Abou Zeid, and Ms. Hanan Zakaria.

We reiterate that this study could not have been possible without the help of many people, and extend our thanks to both those named above and to others who have remain unnamed.

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National Maternal Mortality Study: Egypt, 1992-1993

Findings and Conclusions

*A study is worth nothing unless lessons can be learned
and the population benefits from them.*

Introduction

Each maternal death is a tragedy with major consequences for the family, especially for any children the woman may have. It is a double tragedy when the death could have been avoided. The Ministry of Health launched the first national study of maternal mortality in Egypt, through the Child Spacing Component of the Child Survival Project, with the main goal of developing programs to avoid deaths among pregnant women.

The National Maternal Mortality Study covers a sample of maternal deaths that occurred between 1 March 1992 and 28 February 1993 in all governorates in Egypt, except the five frontier governorates. The specific objectives of the study are:

- To obtain a national figure of maternal mortality in Egypt
- To identify the main causes of maternal mortality
- To determine the avoidable factors contributing to these maternal deaths
- To develop preventive programs to reduce maternal deaths.

Egypt is not unique in having a problem with maternal mortality. Indeed, 99% of all maternal deaths worldwide occur in developing countries, where the risk of death in pregnancy is made worse by high fertility, low literacy, poverty, short spacing, and lack of high-quality medical services (Mahler, 1987; Royston and Armstrong, 1989). Egypt may, however, be in the comparatively unique position of being readily able to do something to reduce maternal mortality.

Considerable progress has already been made in one area that prevents maternal death—family planning and child spacing (DHS II: Egypt, 1993). The increasing use of contraception, observed over the last few years, has an effect in three ways: (1) the number of pregnancies is reduced, thereby decreasing the number of times women face the risk of maternal death, (2) high-risk pregnancy at older ages and higher parities can be avoided, and (3) unwanted pregnancy, which may end up in illegally induced abortion, can be forestalled (Campbell and Graham, 1990; Fortney, 1987; Winikoff and Sullivan, 1987).

Nonetheless, preventing pregnancy cannot be the only solution to maternal mortality, as women will always want some children. Available studies indicate that maternal mortality is remarkably sensitive to standards of obstetric care and is one of the health problems most directly and powerfully influenced by the availability of modern medical care (London, 1992; Maine, 1991).

In this respect, Egypt has a large number of medical doctors and a considerable health infrastructure (DHS: Cairo, 1991). The high population density also means that most women live within close reach of medical facilities where they can receive maternity care, including emergency obstetric care. Training programs for traditional birth attendants (dayas), emphasizing the early detection and referral of women with obstetric complications, have been in progress for several years under the auspices of the Child Spacing Program of the Egypt Ministry of Health and UNICEF (Ricter, 1992; UNICEF, 1985). Reducing maternal mortality in Egypt, therefore, may not require massive new financial resources—rather, available personnel and facilities must be redirected to best meet the needs identified in this study.

The aims of the *National Maternal Mortality Study: Egypt, 1992–1993* are to review and summarize the data collected by the study, indicate the avoidable factors, and identify the major

problems and issues that require action. It also makes preliminary recommendations for action, which will be discussed and elaborated in future meetings and reports. Further analyses may be carried out at a later date to investigate some of these issues in greater depth.

We anticipate that the information from this report will be used by the Minister of Health, senior policy makers, eminent members of the medical profession (including the Deans of Medical Schools, obstetricians, anesthetists, and professors of community medicine), and international donors to implement changes that will benefit women in Egypt. What is required at this stage is not further investigation into the levels and causes of maternal death, but action programs to reduce the numbers of these tragic deaths.

Key Definitions and Terms of the Study

Ten key definitions are set out below: maternal mortality, direct obstetric causes, indirect obstetric causes, incidental deaths, maternal mortality ratio, maternal mortality rate, women of reproductive age, parity, obstetrician, and avoidable factors. Additional definitions of the terms and abbreviations used in this report are provided in Appendix 2.

According to the *International Statistical Classification of Diseases, Injuries and Causes of Death, Ninth Revision (ICD-9)*, **maternal mortality** is "the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes" (WHO, 1977).

There is an international agreement to subdivide maternal deaths into direct and indirect causes (WHO, 1977). **Direct obstetric causes** are "those resulting from obstetric complications of the pregnant state (pregnancy, labor, and puerperium) from interventions, omissions, incorrect treatment or from a chain of events resulting from any of the above." **Indirect obstetric causes** are "those resulting from previous existing disease or diseases that developed during pregnancy and which were not due to direct obstetric causes, but which were aggravated by physiological effects of pregnancy."

Deaths among women who die in pregnancy, delivery, or the postpartum period but which are not due to direct or indirect obstetric causes are termed **incidental deaths** (WHO, 1977). In

our study, incidental deaths due to homicide were not investigated for legal reasons. We also attributed some deaths to an unknown cause, because it was not possible to arrive at a definitive cause of death from the available data.

Women in the National Maternal Mortality Study: Egypt, 1992–1993 were assigned a single *main* cause of death. However, many women also had *multiple direct* obstetric causes of death, and these were recorded as well. For example, a woman could have obstructed labor, cesarean section, and anesthesia as direct obstetric causes of death, and obstructed labor as the single main cause of death. Women assigned a direct cause could not also have an indirect cause of death. Also, those assigned an indirect cause of death were permitted to have only one indirect cause. The classification of the causes of maternal deaths is shown in Figure 1.

Figure 1. Classification of the Causes of Maternal Deaths

A. Direct Obstetric Causes of Death

Hemorrhage

Antepartum hemorrhage (e.g., placental abruption or placenta previa)

Postpartum hemorrhage

Other hemorrhage

Genital Sepsis

Hypertensive Diseases of Pregnancy

Without convulsion

With convulsion

Abortion

Spontaneous

Induced

Other Direct Obstetric Causes

Ectopic pregnancy

Ruptured uterus

Obstructed labor

Cesarean section

Anesthesia
Pulmonary embolism
Other

B. Indirect Obstetric Causes of Death

Anemia
Cardiovascular disorders
Neurological disorders (e.g., epilepsy)
Infectious and parasitic diseases (e.g., bilharzia)
Digestive disorders
Urogenital disorders
Neoplasms
Other (e.g., diseases of the respiratory or endocrine systems)

C. Unknown Causes

D. Incidental Causes of Death

Accidents
Suicide
Burns
Homicides
Other incidental causes

Maternal mortality is usually reported as the ratio of the number of maternal deaths per 100,000 live births. We refer to this as the **maternal mortality ratio** rather than the maternal mortality rate. It is calculated as follows (Campbell and Graham, 1990):

$$\text{MMR} = \frac{\text{Number of maternal deaths in 12 months}}{\text{Number of live births in the same 12 months}} \times 100,000$$

The **maternal mortality rate** is the number of maternal deaths per 100,000 women of reproductive age. It is calculated as fol-

lows (Campbell and Graham, 1990):

$$\text{MMRate} = \frac{\text{Number of maternal deaths in 12 months}}{\text{Average number of women of reproductive age in the same 12 months}} \times 100,000$$

In this study, **women of reproductive age** are defined as women aged between 14 and 50 years, inclusive.

In Egypt, an **obstetrician** can hold one of several degrees: the Diploma, which consists primarily of a one-year theoretical course; the M.S., which consists of three years of practical training (but which unfortunately may be only two years because of the compulsory requirement for a one-year military service [Fahmy, 1988]); the M.D., which consists of an M.S. and a minimum of two more years of academic research; and the M.R.C.O.G., which consists of three years of practical training.

Doctors were asked to record **parity** as the number of previous pregnancies (prior to the pregnancy that led to the woman's death) of 28 weeks gestation or more, regardless of the outcome of the pregnancy. In presenting the results, we did not add the pregnancy that led to the woman's death, irrespective of the gestation of the pregnancy. For example, two women in our study, each with one previous live birth, would have been considered Parity 1 even though one may have died in pregnancy at 20 weeks and the second in the postpartum, having delivered her second live birth.

The term **avoidable factors (or substandard care)** is used to take into account failures in clinical care and also some of the underlying factors that may have produced a low standard of care for the woman (Turnbull et al., 1989). These include shortages of resources for staffing facilities, and administrative failure in maternity services and backup facilities, such as anesthetic, radiological, and pathological services. Patient and/or family factors (such as delays in seeking medical care) contributing to the death are also included, as are substandard care by

the traditional birth attendant (TBA) and by the antenatal care provider. In our study, more than one avoidable factor could contribute to the cause of death. Figure 2 shows the subdivision of avoidable factors.

Figure 2. Classification of the Avoidable Factors Contributing to Maternal Deaths

- A. No or poor quality antenatal care**
- B. Patient Factors**
 - 1. Delay in seeking medical care
 - 2. Unwanted pregnancy
- C. Medical Team Factors**
 - 1. General practitioner
 - a. Failure of diagnosis
 - b. Failure of management
 - 2. Obstetric team
 - a. Availability
 - b. Failure of diagnosis
 - c. Failure of management
 - 3. Traditional birth attendant
 - a. Failure of diagnosis
 - b. Failure of management
- D. Health Facility Factors**
 - 1. Transportation
 - 2. Distance to nearest hospital
 - 3. Blood bank
 - 4. Operating theater
 - 5. Anesthetic facilities
 - 6. Backup facilities
(e.g., pathology, biochemistry, ultrasound, radiological services)
 - 7. Drug availability
(e.g., antibiotics, oxytocic drugs)

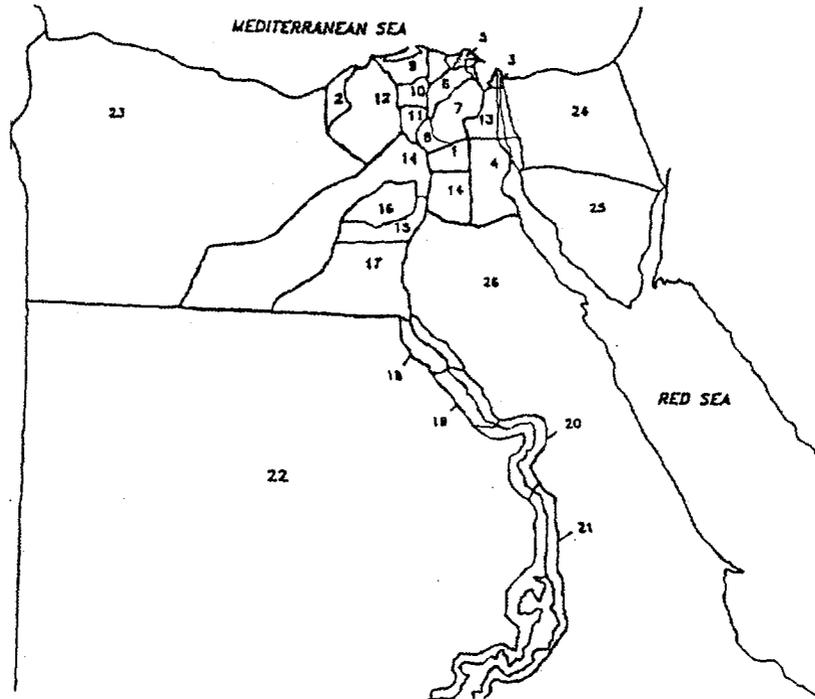
Note: A woman may have more than one avoidable factor contributing to her death.

Study Design Summary

The study was designed as a population-based sample of all maternal deaths over a one-year period in 21 governorates, excluding the five frontier governorates (Figure 3). A random sample of 122 health bureaus was drawn, which included approximately 28% of all registered deaths of females in the reproductive ages (14-50 years) in Egypt. The selected health bureaus (SHBs) were asked to report all deaths of women of reproductive age weekly for one year, starting 1 March 1992. The maternal deaths among these were initially identified by a screening questionnaire at the health bureaus and confirmed by an in-depth home interview with relatives of the deceased woman. If a traditional birth attendant (daya) was involved, she was also interviewed. When a woman had been seen at a health facility or by a medical practitioner, the medical records were reviewed and practitioners interviewed. All questionnaires and records were then reviewed by a governorate-level Local Advisory Group (LAG), causes of death were assigned by consensus, and avoidable factors were determined. Figure 4 shows the flow of data in the study.

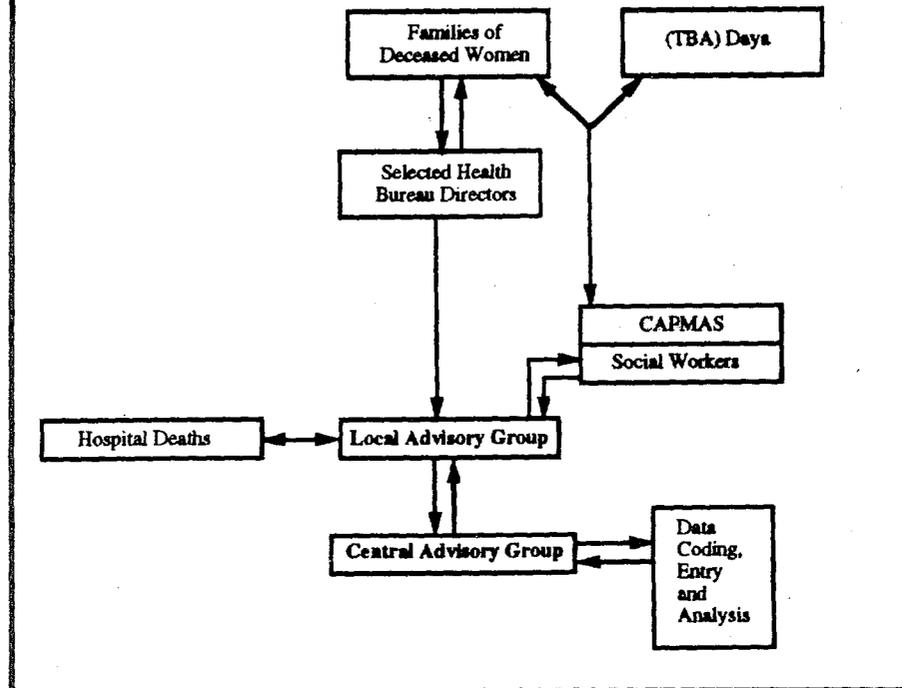
Scientific methods were used in the study. All questionnaires were pretested during a one month pilot study and all those participating in the study, including interviewers, health bureau doctors, and Local Advisory Group members, received training. Quality control measures were used to ensure that refresher training was provided when necessary. Details of the sampling, study methodology, and denominators used to calculate maternal mortality ratios are presented in Appendix 3.

Figure 3. Map of Egypt



Urban	Lower Egypt	Upper Egypt	Frontier
1 Cairo	5 Damietta	14 Giza	22 New Valley
2 Alexandria	6 Dakahlia	15 Beni Suef	23 Matrouh
3 Port Said	7 Sharkia	16 Fayoum	24 North Sinai
4 Suez	8 Kalyubia	17 Menya	25 South Sinai
	9 Kafr El-Sheik	18 Assuit	26 Red Sea
	10 Gharbia	19 Souhag	
	11 Menoufia	20 Qena	
	12 Behera	21 Aswan	
	13 Ismailia		

Figure 4. Flow of Information in the National Maternal Mortality Study: Egypt, 1992-1993



Overall Results

The sample selected for the National Maternal Mortality Study included 7487 deaths of females of reproductive age in the period from 1 March 1992 to 28 February 1993. The number of women who died while pregnant, delivering, or in the 42 days after the end of pregnancy totaled 825. Of these 825 deaths, 772 were maternal deaths, while the remaining 53 were due to incidental causes.

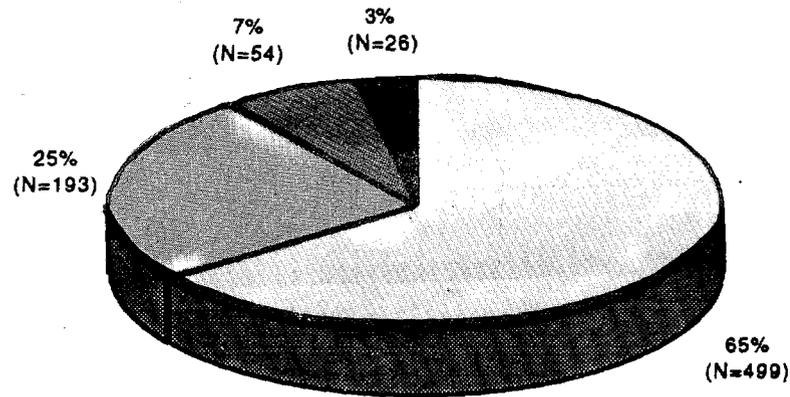
Figure 5 presents major categories of causes and indicates that the large majority of maternal deaths (499 or 65%) were due to direct obstetric causes. For 26 women (3%) it was not possible to arrive at a cause of death from available data. There were also 54 women (7%) with missing questionnaires. These were predominantly deaths toward the end of the study period, when questionnaires were not returned in time. These deaths are included within estimates of the maternal mortality ratio, but are excluded from all tables providing details on causes of death or avoidable factors.

A random sample of 10% of deaths was also selected to provide case studies. These eight cases are cited in the report to illustrate specific points. The random sample ensures that the cases selected were neither exceptionally good nor bad examples.

Female Deaths, Maternal Deaths, and MMRs

Table 1 presents the number of deaths of females of reproductive age and the number of maternal deaths, by governorate and by

Figure 5. Frequency of the Major Causes of Maternal Death



Total no. of cases = 772

Direct Indirect Missing (LAG&FAM) Unknown causes

strata (metropolitan, lower, and upper Egypt). It also shows the percentage of female deaths that were maternal and the maternal mortality ratio, with its 95% confidence interval. The causes of female deaths are shown in Appendix 4.

The numbers of female deaths identified in each governorate were very close to the numbers expected based on the sampling frame. However, the overall proportion of female deaths that were maternal (10.3%) was lower than expected. In developing countries with high maternal mortality, between one-quarter and one-third of female deaths are usually maternal (Royston and Armstrong, 1989), and previous studies using a similar methodology in Menoufia and Giza had proportions of 22.8% and 18.5%, respectively (Fortney et al., 1984;

Table 1. Female Deaths, Maternal Deaths, and Maternal Mortality Ratios, by Governorate and Strata

	Live Births	FD	MD	MD/FD	MMR	Confidence Interval	
						CIL	CIU
Cairo	34,077	1,214	68	5.6	200	156	255
Alexandria	20,608	426	58	13.6	281	216	366
Port Said	4,600	22	7	31.8	152	67	328
Suez	1,597	40	9	22.5	564	275	1,108
Metropolitan	60,882	1,702	142	8.3	233	197	276
Damietta	10,248	162	15	9.3	146	85	247
Dakahlia	55,491	680	62	9.1	112	86	144
Sharkia	38,783	537	48	8.9	124	92	165
Kalyubia	26,174	297	27	9.1	103	69	152
Kafr El-Sheik	30,064	314	29	9.2	96	65	140
Gharbia	15,529	504	33	6.5	213	148	302
Menoufia	23,935	300	28	9.3	117	79	171
Behera	30,937	630	53	8.4	171	130	226
Ismailia	5,845	140	19	13.6	325	202	518
Lower Egypt	237,006	3,564	314	8.8	132	118	148
Giza	24,919	535	55	10.3	221	168	289
Beni Suef	11,274	199	17	8.5	151	91	247
Fayoum	17,724	181	26	14.4	147	98	218
Menya	49,642	431	75	17.4	151	119	190
Assiut	9,377	349	51	14.6	544	409	720
Souhag	13,667	227	42	18.5	307	224	419
Qena	9,841	191	38	19.9	386	277	535
Aswan	8,916	108	12	11.1	135	73	242
Upper Egypt	145,360	2,221	316	14.2	217	195	244
Total	443,248	7,487	772	10.3	174	162	187

Notes: CIL: Lower, CIU: Upper, FD: Female Deaths, MD: Maternal Deaths, MMR: Maternal Mortality Ratio

Fortney et al., 1986; Grubb et al., 1988; Kane et al., 1992; Saleh et al., 1987).

The lower than expected figure in our study has four possible explanations. Firstly, fertility has decreased in Egypt (DHS

II: Egypt, 1993), reducing the number of pregnancies. This reduces the number of maternal deaths and the percentage of female deaths that are maternal, but not necessarily the maternal mortality ratio. Secondly, the studies on which we based our expected proportion were done around ten years earlier than our study. Thirdly, maternal mortality in Egypt is lower than in other developing countries, where a high proportion of female deaths are maternal. Finally, some maternal deaths may have been missed.

All four explanations are likely to play a role, but we feel that, except for deaths in early pregnancy (where the family may not have known that the woman was pregnant), not many maternal deaths were missed. Also the pattern seen whereby metropolitan Egypt had the lowest proportion of maternal deaths (8.3%), followed by lower Egypt and upper Egypt (8.8% and 14.2%, respectively), conforms to what is expected given the level of development. Missing maternal deaths would result in underestimation of the maternal mortality ratio.

The national maternal mortality ratio was 174 maternal deaths per 100,000 live births. This figure is considerably higher than the official CAPMAS figure, but considerably lower than some guesses made in the literature. It accords well with reports from studies conducted in selected villages or governorates in Egypt, which are summarized in Table 2.

One surprising finding is that metropolitan Egypt had such a high maternal mortality ratio (233 per 100,000). This is largely due to the relatively high maternal mortality ratios seen in Alexandria and Suez. These latter may be due to chance, or possibly to special problems facing the urban poor.

The maternal mortality ratios shown for individual governorates must be interpreted with great caution. This is because the sample was only designed to give maternal mortality ratios for metropolitan, lower, and upper Egypt strata, and many governorate-level estimates are imprecise due to small numbers.

Table 2. List of Published Community-Based Studies of Maternal Mortality in Egypt

	Year	No. of Maternal Deaths	MMR	Reference
Vital statistics	1979	1237	78	CAPMAS
Population-based studies				
Lower Egypt				
Giza	1985-86	153	150	El-Kady et al., 1986
Menoufia (RAMOS)	1981-83	385	190	Fortney et al., 1984
Alexandria	1963-82	183	163	El-Ghamry et al., 1984
Upper Egypt				
Assuit (Kausaih)	1984-85	16	178	Abdullah et al., 1985
Souhag	1984-85	23	471	Abdullah et al., 1985
Qena	1984-85	34	323	Abdullah et al., 1985
Qena	1989-90	185	207	Saleh, 1991
Assuit + 3 villages	1987-88	29	368	Abdullah et al., 1992

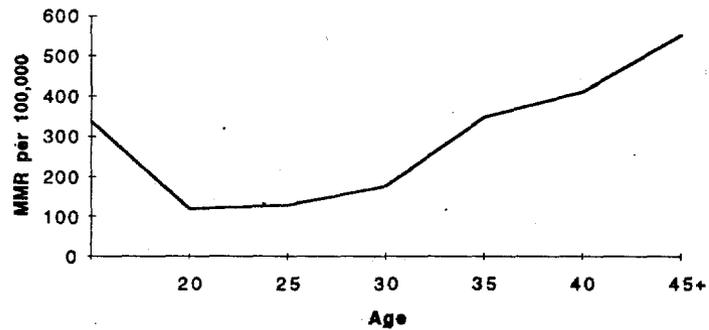
Furthermore, if a governorate over- or underestimated live births, this would have led to under- or overestimates of the maternal mortality ratio, respectively.

Maternal Mortality Ratios by Age and Parity

Figures 6 and 7 show the classical figures of maternal mortality ratios by age and parity. They indicate that young and old mothers are at highest risk of death, as are women having a high-order birth. The risk for first births is only slightly higher than the risk for Parity 1 births. This may be because women having their first birth may obtain better antenatal and obstetric care than higher parity women, who have already experienced childbirth and so may have fewer problems. This finding deserves further investigation.

Table 3 shows that if preventive approaches focus only on women defined as high risk based on age, they will not solve the

Figure 6. Maternal Mortality Ratio by Age Group of the Woman



problem, since only 16.4% of deaths occurred among women aged less than 20 or over 40. This is because while these women have the highest risk of maternal death, they are the least likely to be pregnant (Graham and Airey, 1987).

Figure 7. Maternal Mortality Ratio by Parity Group of the Woman

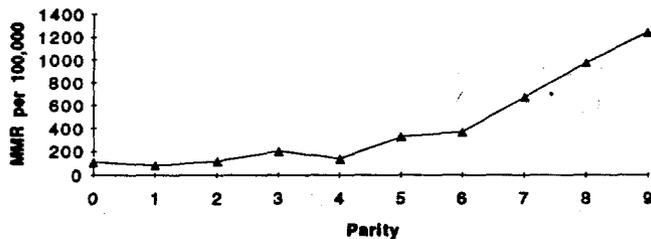


Table 3. Frequency of Maternal Mortality and Percentage of Women Giving Birth, by Age Group

Age Group	Number of Maternal Deaths	Percent of Maternal Deaths	Percent of Women Giving Birth*
< 20	29	4.0	6.3
20-24	101	14.1	20.8
25-29	165	23.0	22.2
30-34	152	21.2	15.5
35-39	182	25.3	8.9
40 +	89	12.4	2.5
Total	718	100.0	

* Source: Egypt DHS II (1993)

Direct and Indirect Causes of Maternal Deaths

Table 4 and Figures 8 and 9 show the direct and indirect causes of death, arrived at by the Local Advisory Groups. As stated in the previous section, it is possible for a woman to have more than one direct obstetric cause of death. Table 4 and Figures 8 and 9 present data showing multiple causes. So, for example, cesarean sections contributed to 6.1% of deaths but were the single main cause in 2.3% of deaths. Appendix 5 lists the single main cause of death.

Among the 718 maternal deaths with completed questionnaires, direct and indirect causes of death contributed 69.5% and 26.9% of maternal deaths, respectively. This is comparable to results obtained from other international studies in developing countries (Maine, 1991). Most maternal deaths took place during delivery or the postpartum: 12.1% of deaths occurred in early pregnancy (before 28 weeks), 13.2% occurred in late pregnancy but before the women were delivered, 39.1% occurred during delivery and the 24 hours after delivery, while the remainder, 35.5%, occurred in the postpartum.

Table 4. Direct and Indirect Causes of Maternal Deaths

	Number	Percent*	Percent of Total
Direct Cause	499		69.5
Hemorrhage	229	45.9	31.9
Placental abruption	49	9.8	6.8
Placenta previa	9	1.8	1.3
Postpartum	178	35.7	24.8
Other	6	1.2	0.8
Hypertensive diseases of pregnancy	114	22.8	15.9
Without convulsion	47	9.4	6.5
With convulsion	67	13.4	9.3
Genital sepsis	60	12.0	8.4
Abortion	32	6.4	4.5
Spontaneous	19	3.8	2.6
Induced	13	2.6	1.8
Other	147	29.5	20.5
Ectopic	4	0.8	0.6
Ruptured uterus	48	9.6	6.7
Obstructed labor	22	4.4	3.1
Cesarean section	44	8.8	6.1
Anesthesia	19	3.8	2.6
Pulmonary embolism	7	1.4	1.0
Other	3	0.6	0.4
Indirect Cause	193		26.9
Anemia	4	2.1	0.6
Cardiovascular	92	47.7	12.8
Neurological disorders	17	8.8	2.4
Infections and parasitic diseases	26	13.5	3.6
Digestive	9	4.7	1.3
Urogenital	2	1.0	0.3
Neoplasms	12	6.2	1.7
Diabetes	6	3.1	0.8
Other	25	12.9	3.5
Unknown Cause	26		3.6
Total	718		100.0

* Percents are calculated for direct causes (N = 499), for indirect causes (N = 193), and for unknown causes (N = 26), as relevant. Percents do not add up to 100, as there can be more than one direct cause.

Figure 8. Direct Causes of Maternal Death

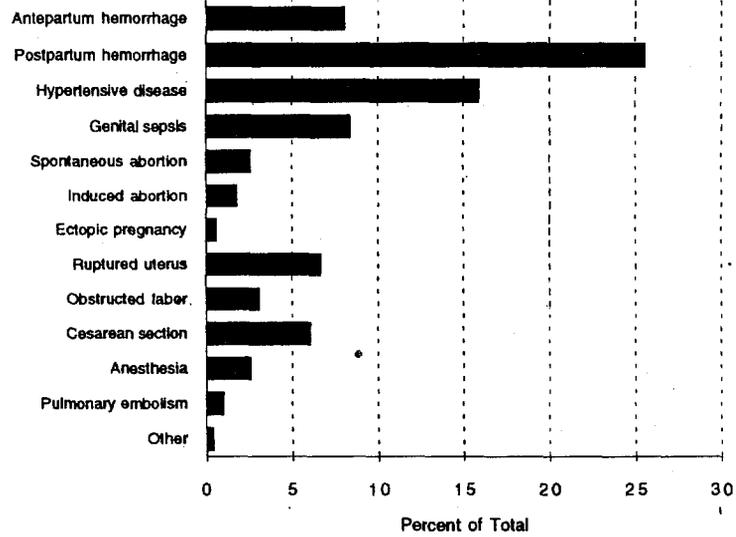
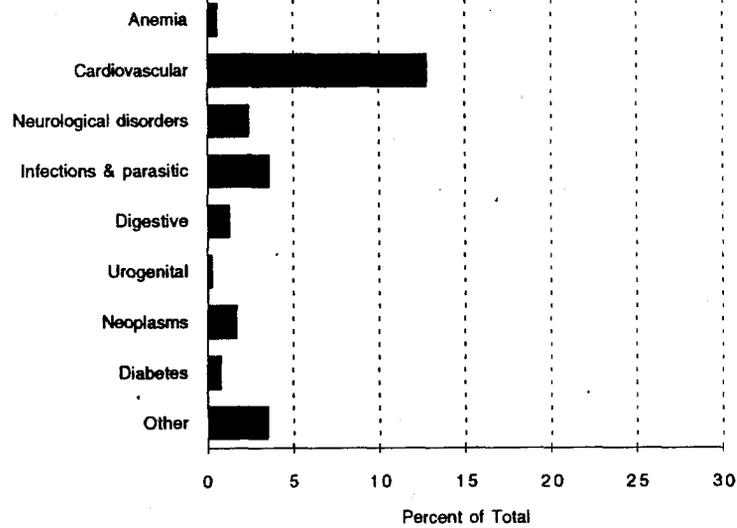


Figure 9. Indirect Causes of Maternal Death



Outcome for the Fetus/Infant

Table 5 shows the outcome for the fetus or infant when maternal death occurs. Overall 410 (57.1%) of the fetuses/infants of deceased women also died. Even when the women died during delivery or in the postpartum period, slightly less than half their infants died at birth or soon after. Although not strictly comparable, deaths in our study were less frequent than those seen in very resource-poor countries such as Bangladesh, where considerably more infants die (Chen et al., 1974; Koenig et al., 1988). Previous research in Egypt has also demonstrated that once a mother dies, even older, living children of the deceased woman suffer problems with their health and nutrition (Saleh, 1989).

Place of Delivery and Place of Death

Table 6 shows that 64% of maternal deaths occurred in health facilities (59% in hospitals, 4% in private clinics, and 1% in other facilities) and 36% occurred at home. However, 70.6% of women had left their homes to seek help in a hospital or clinic at some

Table 5. Outcome for the Fetus or Infant, by Time of Death of the Mother

Outcome	Number of maternal deaths	Percent of maternal deaths
Mother and fetus died in early pregnancy	87	12.1
Mother and fetus died undelivered	95	13.2
Mother died in delivery		
Infant alive	157	21.9
Infant dead	124	17.3
Mother died postpartum		
Infant alive	151	21.0
Infant dead	104	14.5
Total	718	100.0

Table 6. Place of Delivery vs. Place of Death

Place of Delivery	Place of Death		Total
	<i>Home</i>	<i>Health Facility</i>	
Home	134 (63%)	79 (37%)	213 (30%)
Health facility	54 (17%)	269 (83%)	323 (45%)
Undelivered	71 (39%)	111 (61%)	182 (25%)
Total	259 (36%)	459 (64%)	718 (100%)

point during the events leading to their deaths. This suggests a willingness on the part of the population to seek medical care.

It is important to ensure that families, women, and traditional birth attendants are provided with enough information to recognize the danger signs of pregnancy and the puerperium so they can seek care promptly and in an appropriate facility. It is also imperative to ensure that women receive prompt and competent care once they arrive at the appropriate medical facility, and that health units that cannot perform emergency obstetric functions are able to stabilize women and offer emergency first aid. Data from a 1989 survey on availability of services suggests that even in rural areas, 99.1% of women live within 30 kilometers of at least one government hospital (DHS: Cairo, 1991).

Table 7 shows the place of delivery among the women who had actually delivered, the women's usual place of delivery, and the place of delivery of women in Egypt in general. It shows that among the 536 women who delivered, 39.7% delivered at home, in contrast to national data from the DHS II which suggest that 59.3% of women in Egypt deliver at home (DHS II: Egypt, 1993). This pattern undoubtedly occurs because women start out delivering at home and seek care when they run into problems. This is confirmed by the fact that when families were asked where the women usually delivered, 72.7% reported that they

Table 7. Place of Delivery and Usual Place of Delivery

Place of delivery	Now*		Usual**		DHS II(%)
	Number	Percent	Number	Percent	
At home	213	39.7	315	72.8	59.3
General hospital	238	44.4	77	17.8	} 40.7
Private hospital	21	3.9	16	3.7	
Private clinic	63	11.8	23	5.3	
MCH	1	0.2	2	9.4	
Total	536	100.0	433	100.0	100.0

* 182 women had no delivery.

** Excludes women delivering for the first time.

usually delivered at home. Also, women who died in the post-partum period (i.e., after they had already delivered) were slightly more likely to have been delivered at home (42%).

Avoidable Factors

Table 8 shows the avoidable factors contributing to maternal deaths. Avoidable factors were assigned by the panel of doctors comprising the governorate-level Local Advisory Group that met to review each maternal death. Avoidable factors were then reviewed by the Central Advisory Group. As stated in the definitions, the term avoidable factor (or substandard care) is used to take into account failures in clinical care and also some of the underlying factors that may have produced a low standard of care for women. Women could have more than one avoidable factor contributing to their deaths.

Only 54 cases (8%) were felt to be unavoidable with standard-level care, or in other words, 92% of all maternal deaths had one or more avoidable factors. The leading avoidable factor was poor management and diagnosis by the obstetric team (47%). Patient factors, particularly delay in seeking (or non-

Table 8. Avoidable Factors in Relation to Direct, Indirect, and Unknown Causes of Maternal Deaths

Factor	Direct		Indirect		Unknown		Total	
	No.	%	No.	%	No.	%	No.	%
Total number of deaths	499		193		26		718	
No or poor quality ANC	159	32	74	38	6	23	239	33
Delay in seeking medical care	199	40	102	53	3	12	304	42
Unwanted pregnancy	24	5	11	6	1	4	36	5
Substandard care from:								
General practitioner	46	9	41	21	0	0	87	12
Obstetrician team	295	59	36	19	3	12	334	47
Daya	75	15	7	4	2	8	84	12
Lack of drugs, supplies, and equipment in health facilities	14	3	1	1	0	0	15	2
Lack of blood banks	45	9	0	0	0	0	45	6
Lack of transportation	22	4	6	3	0	0	28	4
Cause of death could have been detected during ANC	207	41	131	68	3	12	341	47
No avoidable factors	6	1	30	16	18	69	54	8

Note: Percentages do not add up to 100%, as each death can have more than one avoidable factor.

compliance with) medical care, were another major contributor (42%).

Multiple avoidable factors contributed to the deaths of many women. For example, doctors often reported women arriving at hospitals for obstetric management after much delay, and in complicated conditions that are associated with high mortality even with the best care. In 26% of the 334 cases where poor medical management contributed to the death, delay by the woman was also a factor, undoubtedly complicating management. In some cases women had sought care from several health providers, including private practitioners, further contributing to delay. Where the obstetric team attended moribund cases, they were not judged by the LAGs to have contributed to substandard care.

Patient Factors

Delay in Seeking Medical Care

Delay in seeking medical care, or noncompliance with medical advice, by the patient or her family was one of the main avoidable factors found in this study, and contributed to 42% of all maternal deaths.

The following case (No. 5982) illustrates how patient factors can play a role, together with other avoidable factors.

The woman was 29 years old with three daughters, the last aged 3 when the woman died. The couple wanted another child and stopped using contraceptives. All previous pregnancies had gone well, though all deliveries had been cesarean sections. The husband, who was the respondent, did not give a reason for the previous cesarean sections.

In this pregnancy, everything went well up to the sixth month. The woman visited her private antenatal care clinic seven times for routine check-ups. One day, in the sixth month of her pregnancy, she fell down and started bleeding. She went to the private clinic where she received intravenous fluids. The bleeding stopped and she returned home. After that day, the bleeding recurred several

times during the pregnancy. With every bleeding episode she was admitted, received intravenous fluid or a blood transfusion, and the bleeding stopped. Every time she went to the private clinic, the obstetrician was against her discharge. He wanted her to deliver in the clinic because of placenta previa. Every time the bleeding stopped, however, she insisted on being discharged.

In the ninth month, she had a severe attack of bleeding at home. She went to the clinic and was immediately transferred to a government hospital, where she received intravenous fluids and blood transfusions. After 12 hours, the bleeding had not stopped and the hospital obstetrician proceeded to a cesarean section. Shortly after the cesarean section the bleeding resumed. Nine hours later a hysterectomy was done, and the woman died soon after the hysterectomy. The diagnosis on the hospital file was: placenta previa, cesarean section followed by postpartum atonic bleeding, hysterectomy followed by a defect in blood clotting (disseminated intravascular coagulation).

The woman in Case 5982 was familiar with and used a number of health services, including family planning, antenatal care, and hospital care. She also sought attention each time she had a bleeding episode and went rapidly to the hospital at the time of her last, fatal bleeding episode. Nevertheless, during earlier bleeding episodes she discharged herself against recommendations; therefore, patient factors clearly contributed to the death.

On the other hand, it is easy to imagine that she may not have been able to comply with an open-ended recommendation to stay in a private clinic or hospital from six months gestation onward, particularly with responsibilities toward three young children and a husband. Khattab (1992) identifies health professionals' lack of knowledge of the social conditions of women's lives as one reason for noncompliance.

In some instances, delay takes place because women and their families do not recognize the danger signs in pregnancy. With placenta previa and placental abruption, for example, it seems that slight bleeding at the end of pregnancy does not alarm many people and is considered to be a normal or heavy

showing. One woman in our study had seven attacks of antepartum bleeding in four weeks but was only taken to hospital—in a state of irreversible shock—for her last bleeding episode. Similar results were found in another study in Egypt (Khattab and Kamal, 1988).

Other studies in Egypt have highlighted the fact that many women cannot take autonomous decisions concerning their own health, and must persuade other decision-makers (the husband or mother-in-law) of the importance of their illness (Khattab, 1992; Lane and Meleis, 1991). Our study attempted to look at decision-making by asking who made the decision to transfer women to a hospital, but the high degree of medical involvement in these serious and eventually fatal cases meant that the husband made the decision to transfer his wife to the hospital in only 27% of the cases, while a medical practitioner made the decision in 50% of the cases.

Lack of or Poor Quality Antenatal Care

As an avoidable factor, lack of antenatal care or poor quality care contributed to 239 deaths (33.3%). Of these, 96 women (40.2%) had sought antenatal care but were judged to have received poor quality care.

Table 9 shows that 64.9% of women had attended antenatal care, and 50% had attended three or more times. This is a higher percentage than the 52.9% of women who reported receiving antenatal care in the DHS II, which on face value suggests that women having antenatal care are slightly more likely to die. One possible explanation for this anomalous finding is that the women who died experienced problems in pregnancy that led them to seek antenatal care. Alternatively, families may have reported antenatal visits that did not take place because they feared being blamed for the death.

Table 9. Attendance at Antenatal Care

ANC Visits	Number of Maternal Deaths	Percent of Maternal Deaths
None	249	34.7
1	44	6.1
2	63	8.8
3-9	268	37.3
10 +	91	12.7
Missing data	3	0.4
Total	718	100.0

Interpreting whether no or poor quality antenatal care contributes to maternal death is complex. This is because not all causes of maternal death can be prevented, detected, or treated during antenatal care (Rooney, 1992). For example, antenatal visits should detect the hypertension and proteinuria indicative of pre-eclampsia. In this case, no or poor quality antenatal care may well contribute to a death from hypertensive disease. By contrast, antenatal visits are unlikely to play a role in preventing deaths from postpartum hemorrhage or pulmonary embolism, and not having antenatal care will not contribute to death from these causes. For this reason, Local Advisory Groups were asked to judge for each maternal death whether an antenatal visit would have detected the cause of death. Local advisory groups felt that 47.5% of all causes of maternal deaths could have been detected during antenatal care; this is particularly true for indirect causes, such as rheumatic heart disease, where 63% of deaths were felt to be detectable during antenatal care.

Unwanted Pregnancy

Among the maternal deaths, 35.2% had previously used contraception, compared to 64.6% of ever married women in the general population (DHS II, 1993). Sadly, among the 235 women

who had used contraceptives, 17% had been using contraceptives at the time they got pregnant, and could be viewed as contraceptive failures. Also, according to the families, an additional 14% of pregnancies were unwanted at the time they occurred, indicating a missed opportunity for contraception. Adding the contraceptive failures to families' reports of unwanted pregnancies brings the total of pregnancies that were not desired at the time to 140 (19.5%). However, the Local Advisory Groups judged that unwanted pregnancy contributed to only 36 deaths (5%).

Medical Team Factors

Obstetricians played a major role in the avoidable factors contributing to maternal deaths, with failure of early diagnosis and poor management contributing to 47% of all deaths. Specific problems are discussed in the next section on cause-specific results, and several of the case studies in the cause specific section also illustrate some of the medical team problems.

Review of the maternal deaths revealed that there was no referral system in place in the health care system, and that this gap applied both to when and to where cases were referred. In a disproportionately large number of cases, women who died had been to see private practitioners who delayed referring them to hospital facilities. It also emerged that there were no protocols for dealing with obstetric emergencies, and most were managed by junior staff, with senior staff usually called too late. El-Mouelhy (1987), who reviewed all maternal mortality studies in Egypt, makes similar observations. It is worth noting in this context that an obstetrician in Egypt is defined as someone who has done one of several degrees, some of which are short and primarily theoretical.

Traditional birth attendants (dayas) contributed to 12% of deaths. Since a large percentage of Egyptian women use traditional birth attendants (59.3% according to DHS II and 57% ac-

According to PAPCHILD [Abdel-Azeem et al., 1993; DHS II: Egypt, 1993]), this suggests that the traditional birth attendant training programs conducted by the Ministry of Health and UNICEF are relatively successful in teaching traditional birth attendants to refer women with complications promptly.

General practitioners also played a small role in the avoidable factors (12%). This is probably because comparatively few women sought care from a general practitioner, preferring to go to an obstetrician instead.

Health Facility Factors

Internationally, the lack of health facilities, particularly first referral level hospitals, is identified as one of major factors culpable for maternal deaths (Maine, 1991). In our study, the lack of appropriate facilities and supplies played a minor role.

Table 6, and the discussion following it, suggests that most women both had access to and went to a hospital at some point during the events leading to their deaths. Other factors played a relatively minor role in contributing to maternal deaths. Of these, the lack of blood banks was the leading contributor (6%), followed by distance and/or lack of transportation (4%). Lack of drugs, supplies, and equipment in health facilities contributed to 2% of maternal deaths.

The following case (No. 7885) illustrates how lack of blood played a role in contributing to maternal death:

The woman was 37 years old, with one daughter and three sons, when she died. She had experienced one stillbirth, but none of her other pregnancies had caused any problems. She had been using an IUD when she got pregnant this time (contraceptive failure). During this pregnancy, she visited her obstetrician five times for routine antenatal check ups in a private clinic, and everything went well. Her last routine antenatal visit was three days before her death.

As with previous deliveries, she went to a private clinic to deliver when her labor pains started. She delivered a healthy baby without

any problems. Shortly after delivery, however, she started bleeding and the obstetrician asked the husband to buy 2 units of blood. The husband went to one hospital but could not find the appropriate blood group, and then obtained the two units from another hospital. Half an hour later the obstetrician asked for more blood. The husband searched among many hospitals, until he found the correct blood group.

When he came back with the blood he found the obstetrician carrying his wife to his car. She was transferred to a private hospital where she was immediately admitted for hysterectomy. Between delivery and the hysterectomy, 20 hours had elapsed. The husband was asked again to look for more blood. When he finally found the blood and returned to the hospital, his wife had died. The final diagnosis was severe atonic postpartum hemorrhage after normal vaginal delivery, followed by death due to irreversible shock.

Together with substandard care by the obstetric team, difficulties in obtaining blood clearly contributed to the death of this woman.

Cause-Specific Results

This section summarizes some of the most important findings from the cause-specific results. Selected results are presented in Tables 10 and 11, which show the use of antenatal care, the reasons for the last antenatal care visit, the place of delivery, the place of death, and avoidable factors by cause of death. Only causes with more than 30 deaths are included.

By comparing the percentages for a specific cause with the percentages for all maternal deaths, it is possible to see if a given factor plays a particular role in contributing to mortality from that cause. For example, Table 11 shows that shortage of blood contributed to 6% of maternal deaths overall. However, the same factor contributed to 14% of antepartum hemorrhage deaths and 20% of postpartum hemorrhage deaths, indicating that blood shortages play a more important role for these two specific causes than for other causes. By contrast, shortage of blood contributed to 1% of deaths from hypertensive diseases of pregnancy, indicating that blood shortages are less of an issue for this specific cause.

Direct Causes

Hemorrhage

Hemorrhage occurred in 229 cases, making it the leading contributor to maternal mortality in Egypt. Hemorrhage accounted for almost one-third (32%) of all maternal deaths and almost half (46%) of all direct maternal deaths. The maternal mortality ratio for hemorrhage was 51.7 per 100,000.

Table 10. Summary Characteristics of Cause-Specific Deaths

	All N = 718	Hemorrhage		Hypertension N = 114	Sepsis N = 60	Abortion		Ruptured Uterus N = 48	Cesarean Section N = 44	Cardiac Disease N = 55
		Antepartum N = 58	Postpartum N = 178			Spont. N = 19	Induced N = 13			
Antenatal care										
Never	249 (35%)	26 (45%)	53 (30%)	31 (27%)	33 (55%)	9 (47%)	6 (46%)	22 (46%)	9 (20%)	13 (24%)
1 or 2	107 (15%)	9 (16%)	25 (14%)	15 (13%)	9 (15%)	4 (21%)	3 (23%)	7 (15%)	8 (18%)	7 (13%)
3 or more	359 (50%)	23 (40%)	99 (56%)	68 (60%)	18 (30%)	6 (32%)	4 (31%)	19 (40%)	26 (59%)	35 (64%)
Missing data	3 (0%)								1 (2%)	
Place of delivery										
None	182 (25%)	17 (29%)	0	42 (37%)	0	19 (100%)	13 (100%)	11 (23%)	0	23 (42%)
Home	213 (30%)	5 (9%)	70 (39%)	17 (15%)	39 (65%)	0	0	6 (12%)	0	12 (22%)
Public facility	239 (33%)	35 (60%)	68 (38%)	44 (39%)	16 (27%)	0	0	24 (50%)	30 (68%)	18 (33%)
Private facility	84 (12%)	1 (2%)	40 (22%)	11 (10%)	5 (8%)	0	0	7 (15%)	14 (32%)	2 (4%)
Place of death										
Home	259 (36%)	15 (26%)	54 (30%)	31 (27%)	27 (45%)	8 (42%)	2 (15%)	9 (19%)	4 (9%)	31 (56%)
Public hospital	420 (58%)	39 (67%)	108 (61%)	76 (67%)	31 (52%)	10 (53%)	8 (62%)	37 (77%)	34 (77%)	24 (44%)
Private clinic	29 (4%)	0	15 (8%)	3 (3%)	1 (2%)	1 (5%)	2 (15%)	2 (4%)	6 (14%)	0
Other	10 (1%)	4 (7%)	1 (1%)	4 (4%)	1 (2%)	0	1 (8%)	0	0	0

Table 11. Summary Avoidable Factors for Cause-Specific Deaths

	All N = 718	Hemorrhage		Hypertension N = 114	Sepsis N = 60	Abortion		Ruptured Uterus N = 48	Cesarean Section N = 44	Cardiac Disease N = 55
		Antepartum N = 58	Postpartum N = 178			Spont. N = 19	Induced N = 13			
Avoidable causes										
ANC-related**	239 (33%)	32 (55%)	40 (22%)	59 (52%)	10 (17%)	4 (21%)	3 (23%)	16 (33%)	9 (20%)	24 (44%)
Delay	304 (42%)	35 (60%)	62 (35%)	64 (56%)	18 (30%)	8 (42%)	3 (23%)	14 (29%)	10 (23%)	36 (65%)
Substandard care										
General Practitioners	87 (12%)	5 (9%)	14 (8%)	8 (7%)	10 (17%)	2 (11%)	0	4 (8%)	0	7 (13%)
Obstetric team	334 (47%)	33 (57%)	110 (62%)	71 (62%)	21 (35%)	11 (58%)	10 (77%)	35 (73%)	41 (93%)	16 (29%)
Days	84 (12%)	6 (10%)	42 (24%)	2 (2%)	22 (37%)	0	0	6 (13%)	0	1 (2%)
Shortages, etc.										
Blood	45 (6%)	8 (14%)	36 (20%)	1 (1%)	0	1 (5%)	0	4 (8%)	5 (11%)	0
Transportation/distance	28 (4%)	0	0	2 (2%)	0	2 (11%)	0	2 (4%)	0	0
Other drug supply/equip.	15 (2%)	5 (9%)	11 (6%)	3 (3%)	0	0	0	1 (2%)	5 (11%)	0
No avoidable factors	54 (8%)	1 (2%)	1 (1%)	1 (1%)	2 (3%)	2 (11%)	0	0	0	4 (7%)

* Percents do not add up to 100, as there can be more than one direct cause.

** Both poor quality and inadequate attendance.

The large majority of hemorrhage deaths (178 or 78%) were associated with postpartum hemorrhage. In addition, 58 women died from antepartum hemorrhage. These numbers include 13 women who had both antepartum and postpartum hemorrhage. Six women had other types of hemorrhage. Results are reported separately for antepartum and postpartum hemorrhage.

Antepartum Hemorrhage

The maternal mortality ratio for antepartum hemorrhage was 13 per 100,000. The large majority of the antepartum hemorrhage deaths (84%) were associated with placental abruption, while the remainder were due to placenta previa. Maternal mortality ratios for these two causes were 11 per 100,000 and 2 per 100,000.

Older women constituted the majority of antepartum hemorrhage deaths, and were more likely to have died from antepartum hemorrhage than from other causes. Out of the 58 deaths from antepartum hemorrhage, 56.9% occurred in women aged 35 years or older.

Parity was also a risk factor: grandmultiparas (Parity 5+) had a maternal mortality ratio of 65.8 per 100,000, compared to 15.0 per 100,000 for Parity 3-4, 7.6 per 100,000 for Parity 1-2, and 1.4 per 100,000 for Parity 0.

Rural women in upper Egypt had the highest maternal mortality ratio for antepartum hemorrhage (22 per 100,000), followed by rural women in lower Egypt (13 per 100,000), metropolitan Egypt (11 per 100,000), urban upper Egypt (9 per 100,000), and urban lower Egypt (4 per 100,000).

Women without an education also had a higher maternal mortality ratio for antepartum hemorrhage (20 per 100,000) than women with an education (6 per 100,000).

Tables 10 and 11 show the use of antenatal care, the place of delivery, the place of death, and avoidable factors for maternal deaths from antepartum hemorrhage.

Women who had no antenatal care during pregnancy represented 45% of all deaths from antepartum hemorrhage, and lack of or poor quality antenatal care was considered an avoidable factor in 55% of the cases. The figures for all causes of death are 35% and 33%, respectively, indicating that lack of or poor quality antenatal care played a significant role in deaths from antepartum hemorrhage compared to those from other causes.

The majority of the women who delivered did so in a hospital (36/41 or 88%), and 38 of these (93%) were delivered by obstetricians. Only 4 of the 58 women with antepartum hemorrhage (7%) were not seen by a physician at some point immediately around the time of death.

In addition to the lack of or poor quality antenatal care (55%), delay or noncompliance in seeking medical care (60%) and substandard care by the obstetric team once women reached medical care (57%) were identified as the most important avoidable factors. This is both because they played a role in the majority of deaths from antepartum hemorrhage (over 50%) and because they were more likely to contribute to deaths from antepartum hemorrhage than to those from all maternal causes, where delay or noncompliance in seeking care and substandard care by the obstetric team were associated with 42% and 47% of deaths, respectively.

Also a shortage of blood contributed to 6% of maternal deaths overall, but contributed to 14% of antepartum hemorrhage deaths, indicating that remedying blood shortages would have a larger impact on deaths from this specific cause.

The following case history (No. 6801) illustrates a death from antepartum hemorrhage:

The woman was 35 years old when she died. She had seven children, five of whom were alive at the time of the interview. Her previous pregnancies and deliveries had been normal vaginal deliveries, except for one cesarean section done 16 years ago. The last baby was born two years ago. She was known to have rheumatic heart disease but was not under any treatment.

In this pregnancy, she attended four antenatal care visits with an obstetrician in a private clinic. She had two bleeding episodes: once in the first trimester and a second time in the last trimester. The second bleeding episode was so severe that it soaked her clothes. Due to the severity of the bleeding, she was quickly taken to a hospital. She reached the hospital about two hours after the bleeding had started. The attending obstetrician came immediately, but she died before any medication or treatment could be given.

Postpartum Hemorrhage

Postpartum hemorrhage occurred in 178 women who died, and the maternal mortality ratio for postpartum hemorrhage was calculated as 40 per 100,000.

Women over 35 constituted a large proportion of postpartum hemorrhage deaths (37.6%) and were more likely to die from postpartum hemorrhage than from other causes. Women less than 20 were also more likely to die from postpartum hemorrhage.

Parity was another risk factor; grandmultiparas (Parity 5+) had a maternal mortality ratio of 110 per 100,000, compared to 60 per 100,000 for Parity 3–4, 24 per 100,000 for Parity 1–2 and 26 per 100,000 for Parity 0.

There was no clear pattern by residence: metropolitan women had the lowest maternal mortality ratio for postpartum hemorrhage (26 per 100,000), followed by rural women (37 per 100,000 and 46 per 100,000 in lower and upper Egypt, respectively), and urban women (46 per 100,000 and 58 per 100,000 in lower and upper Egypt, respectively).

Women without an education had a higher maternal mortality ratio for postpartum hemorrhage (47 per 100,000) than women with an education (33 per 100,000).

Tables 10 and 11 show the use of antenatal care, the place of delivery, the place of death, and avoidable factors for maternal deaths from postpartum hemorrhage.

Women who had no antenatal care during pregnancy represented 30% of all deaths from postpartum hemorrhage, but lack of or poor quality antenatal care was considered an avoidable factor in only 22% of the cases, largely because there is not much that can be done antenatally for detecting or preventing postpartum hemorrhage. This compares to 35% and 33%, respectively, for all causes of maternal deaths.

The majority of the women (60%) delivered in a health facility: 38% delivered in a government hospital, 6% delivered in a private hospital, and 16% delivered in a private clinic, while 39% of women delivered at home. Only 13 of the 178 women with postpartum hemorrhage (7%) were not seen by a physician at some point immediately around the time of death. The fact that 22% of women dying from postpartum hemorrhage delivered in a private facility is noteworthy, particularly since, among all maternal deaths, only 84 of the 536 women who delivered (15.7%) did so in a private facility. Possible reasons for this excess of postpartum hemorrhage deaths in private facilities may include poor management of the third stage, lack of adequate blood supplies, and reluctance to transfer a patient and lose custom.

The most commonly identified avoidable factor was substandard care by the obstetric team (62%). Substandard care by the traditional birth attendant (daya) and lack of blood were also identified as important avoidable factors (24% and 20% of the cases, respectively). All three factors were more likely to play a role in deaths from postpartum hemorrhage than in those from all maternal causes, where substandard care by the obstetric team, substandard care by the traditional birth attendant, and blood shortages were associated with 47%, 12%, and 6% of deaths, respectively.

The following case history (No. 10151) illustrates some of the avoidable factors in a woman who died from postpartum hemorrhage:

The woman was 35 years old when she died. She had been married for 20 years and had given birth to nine children, one of which had died. She had no previous medical problems and her previous pregnancies had been normal, except for a postpartum bleeding episode after one delivery. Because of her long experience, she did not find it necessary to go for routine antenatal check-ups during this pregnancy.

Her pregnancy went well. When she was near term, however, she suddenly developed acute abdominal pain and started bleeding. She went to see an obstetrician in a private clinic who gave her an injection, after which the labor started and the bleeding stopped. After six hours, the obstetrician transferred her to a government hospital where she delivered a dead baby. After the delivery, she started bleeding massively. She received a blood transfusion (100 cc) but there was insufficient blood. The bleeding continued. Hysterectomy was done the next morning but the patient was in irreversible shock and died.

This case also illustrates that women could have more than one cause of death, as this woman also experienced antepartum hemorrhage.

Hypertensive Diseases of Pregnancy

Hypertensive diseases of pregnancy are a major cause of maternal death in Egypt, accounting for 16% of all maternal deaths and 23% of direct obstetric deaths. There were 114 cases with hypertensive diseases, 67 cases with convulsions (59%) and 47 without (41%). These formed 13% and 9% of all direct obstetric deaths, respectively, and 9% and 7% of all maternal deaths, respectively. In 10 of the 114 cases, there were associated conditions making the hypertensive diseases more serious.

The maternal mortality ratio for all deaths from hypertensive diseases of pregnancy was 26 per 100,000; the maternal mortality ratio for those deaths with convulsions was 15 per 100,000 and for those without convulsions, 11 per 100,000. The characteristics of women who died with convulsions and of those who died without convulsions, and the avoidable factors con-

tributing to these deaths, were relatively similar. For the purposes of this report, women dying with convulsions and without convulsions are grouped, and any differences are noted.

Women under 20 years of age and those over 30 were more likely to die from hypertensive diseases of pregnancy than from other causes. The maternal mortality ratios for hypertensive diseases of pregnancy overall by age were 59 per 100,000 for women aged less than 20, 19 per 100,000 for those aged 20–24, 15 per 100,000 for those aged 25–29, 24 per 100,000 for those aged 30–34, 51 per 100,000 for those aged 35–39, and 88 per 100,000 for those over 40. Women who died without convulsions were proportionally more likely to be older than those who died with convulsions, perhaps reflecting essential hypertension in the former.

Parity was also a risk factor for women having their first child and for grandmultiparas (Parity 5+), although here, women who died with convulsions were proportionally more likely to be having their first child than those who died without convulsions. The overall maternal mortality ratios for hypertensive diseases were 26 per 100,000 for Parity 0, compared to 11 per 100,000 for Parity 1–2, 22 per 100,000 for Parity 3–4, and 86 per 100,000 for Parity 5+.

There was no clear pattern by residence: metropolitan women had the lowest maternal mortality ratio for hypertensive diseases of pregnancy (13 per 100,000), followed by women in upper Egypt (27–28 per 100,000), and then women in lower Egypt (27–42 per 100,000).

Women without an education had a higher maternal mortality ratio for hypertensive diseases of pregnancy (33 per 100,000) than women with an education (18 per 100,000).

Tables 10 and 11 show the use of antenatal care, the place of delivery, the place of death, and avoidable factors for maternal deaths from hypertensive diseases.

Women who had no antenatal care during pregnancy repre-

sented 27% of all deaths from hypertensive diseases of pregnancy, but lack of or poor quality antenatal care was considered to be an avoidable factor in 52% of the cases, in part because it was felt that good antenatal care should have been able to detect and treat pre-eclampsia. The comparable figures for all causes of maternal deaths are 35% and 33%, respectively.

Many women (37%) died before delivering. Of the remainder, 39% delivered in a government hospital, 4% delivered in a private hospital, and 6% delivered in a private clinic. Only 8 of the 114 women with hypertensive diseases of pregnancy postpartum (7%) were not seen by a physician at some point immediately around the time of their deaths.

The most commonly identified avoidable factors were related to lack of or poor quality antenatal care (52%), delay in seeking (or noncompliance with) medical care by the patient or her family (56%), and substandard care by the obstetric team (62%). All three factors were more likely to play a role in deaths from hypertensive disease of pregnancy than in deaths from all maternal causes, where they were associated with 33%, 42%, and 47% of deaths, respectively.

The following case history (No. 8792) illustrates some of these avoidable factors in a woman who died from hypertensive disease:

The woman was 40 years old when she died. She had two girls and four boys, one of whom had died in the neonatal period. All the deliveries had been normal vaginal deliveries, but she had a previous postpartum hemorrhage. She had also had two spontaneous abortions. After her last delivery she started using the pill but she stopped because of the side effects. She was known to be hypertensive for the last 12 years and also had a goiter.

During the last pregnancy she visited her obstetrician four times. Her blood pressure was high and drugs were given. At six months of pregnancy she suddenly fell to the ground unconscious and went into a deep coma. Her husband called the obstetrician who came quickly. He said the blood pressure was very high. She died half an hour later at home.

Genital Sepsis

Genital sepsis was shown to be associated with 60 maternal deaths: 12% of the direct obstetric deaths and 8% of all maternal deaths. The maternal mortality ratio was 13.5 per 100,000.

Young and old maternal age and high parity were clear risk factors. Women younger than 20 or older than 35, for example, were three times more likely to die of sepsis than women aged 20–24. The maternal mortality ratios for genital sepsis by age were 30 per 100,000 for women aged less than 20, 10 per 100,000 for those aged 20–24, 11 per 100,000 for those aged 25–29, 12 per 100,000 for those aged 30–34, 29 per 100,000 for those aged 35–39, and 28 per 100,000 for those over 40.

Women of Parity 5+ were four times more likely to have died of sepsis than of other causes, compared to women of Parity 1–2. The maternal mortality ratio for women of Parity 5+ was 42 per 100,000, compared to maternal mortality ratios between 10 and 11 per 100,000 for all other parities.

The pattern of maternal mortality by residence was similar to that of postpartum hemorrhage: metropolitan women had the lowest maternal mortality ratio for genital sepsis (9.4 per 100,000), followed by rural women (12.9 per 100,000 and 11.4 per 100,000 in lower and upper Egypt, respectively), followed by urban women (21.8 per 100,000 and 19.4 per 100,000 in lower and upper Egypt, respectively). The differences are not statistically significant.

The large majority (72%) of the women dying from puerperal sepsis had not received any formal education, and women without an education also had a higher maternal mortality ratio for sepsis (19.1 per 100,000) than women with an education (4.7 per 100,000).

Tables 10 and 11 show the use of antenatal care, the place of delivery, the place of death, and avoidable factors for maternal deaths from genital sepsis.

Women who had no antenatal care during pregnancy represented 55% of all deaths from sepsis, but lack of or poor quality antenatal care was considered an avoidable factor in only 17% of the cases. This may be because there is not much that can be done antenatally for detecting or preventing sepsis which usually occurs postpartum. The comparable figures for all maternal causes of death were 35% and 33%, respectively.

The majority of the women (65%) delivered at home where they were helped by a *daya* (N = 23), a nurse (N = 2), or a member of the family (N = 12); only 27% delivered in a government hospital, while 8% delivered in a private facility. Of the 60 women with sepsis, 59 (98%) were seen by a physician at some point immediately around the time of death, but nearly half (28/60 or 47%) had also been attended by a *daya* at some point, compared to 15.6% of all maternal deaths being attended by a *daya*. The high proportion of home deliveries (65%) is also interesting, particularly since, among all maternal deaths, only 213 of the 536 women who delivered (39.7%) did so at home. This suggests that home deliveries and attendance by a *daya* particularly increase the risk of death from sepsis.

Indeed, the most commonly identified avoidable factor was substandard care by the traditional birth attendant or *daya* (37%), a much greater contribution by traditional birth attendants than that which they made to maternal deaths overall (12%). In-depth quantitative and qualitative research on *dayas'* practices and maternal mortality in Giza, Egypt has shown that some *dayas* resort to excessive numbers of vaginal examinations and may attempt to dilate the vagina with their fingers (El-Kady et al., 1989). Substandard care by obstetricians contributed to 35% of sepsis deaths, making them less likely to contribute to sepsis deaths than to other maternal deaths (47%).

The following case history (number 7945) illustrates some of the avoidable factors in a woman who died from puerperal sepsis:

The woman was 35 years old when she died. She had given birth to four boys and two girls and her sister-in-law reported that she had also had an induced abortion. Her pregnancy was normal, she did not attend an antenatal clinic. When she felt labor pains, they sent for the daya. The daya examined the woman and noted that there was a problem: the baby was either coming with his hands first or with his legs first.

The daya advised transfer to a hospital, which she did by ambulance. The woman delivered a healthy baby in the hospital and was discharged. On the sixth day after delivery she developed a fever; a physician consulted her at home and referred her to a hospital where they diagnosed puerperal sepsis. She stayed in the hospital for five days, was discharged, and died three days later at home.

Abortion

Identifying deaths due to abortion, and correctly classifying them as spontaneous or induced, is notoriously difficult (Barreto et al., 1992). This is because deaths in early pregnancy may be missed, and, where induced abortion is illegal, families will be reluctant to admit induced-abortion deaths. It is likely that as in other studies worldwide, our study also missed and misclassified induced-abortion deaths.

Abortions are classified as a direct cause of maternal death. They account for 4.5% of all maternal deaths, and 6.4% of direct obstetric deaths. There were 32 cases involving abortion, 19 cases that were judged to be spontaneous (59%) and 13 judged to be induced (41%). These formed 3.8% and 2.6% of all direct obstetric deaths, respectively, and 2.6% and 1.8% of all maternal deaths, respectively. The maternal mortality ratio was 4 per 100,000 for spontaneous abortion and 3 per 100,000 for induced abortion.

El-Mouelhy (1987) presents the reported proportions of all abortions that are induced. These studies (including hospital admission case series) show that the estimated proportion of induced or septic abortions in Egypt ranges from 60% to 2%. The

studies reviewed and cited in her paper include the following proportions of induced or septic abortions: 60% (Alexandria), 50–25% (Kamal, Cairo University: 1969), 37.6% (El-Kashlan, Al-Galaa: 1974), 25% (Al-Galaa: 1977), 22% (Kamal, UAR: 1975), 13.6% (El-Kholi, Tanta: 1971), 9.8% (Foda, UAR: 1977), 5.6% (Toppozada, Alexandria: 1974–77), 3.9% (El-Kabariti, Ain Shams: 1984), and 1.7% (El-Katsha, Ahmed Maher Hospital: 1983). Since deaths due to abortion are likely to come disproportionately from induced-abortion deaths, our finding that 41% of abortions were induced, contributing to 1.8% of all maternal deaths, seems plausible. The data therefore suggest that induced abortion is not as large a problem in Egypt as in some other countries, where it can contribute to over 50% of all maternal deaths (Royston and Armstrong, 1989).

Because of the different natures of spontaneous and induced abortions, it makes little sense to present combined results. However, when separated, only small numbers remain in each category. For this reason, and because no striking patterns of age, parity, residence, or education emerge, no further analysis is presented on maternal mortality ratios. The use of antenatal care, the place of delivery, the place of death, and avoidable factors for maternal deaths from abortion are shown in Tables 10 and 11.

Ruptured Uterus

There were 48 cases of ruptured uterus, representing 10% of direct obstetric deaths and 7% of all maternal deaths. The maternal mortality ratio was 10.8 per 100,000. In 52% of cases, ruptured uterus was reported as a single cause of death. Commonly reported associated causes were postpartum hemorrhage (N = 14) and obstructed labor (N = 10).

Young and old maternal age and high parity were clear risk factors. The maternal mortality ratios for ruptured uterus by age were 20 per 100,000 for women aged less than 20, 3 per 100,000

for those aged 20–24, 6 per 100,000 for those aged 25–29, 10 per 100,000 for those aged 30–34, 31 per 100,000 for those aged 35–39, and 42 per 100,000 for those over 40.

Women of Parity 5+ were 12 times more likely to have died from ruptured uterus than from other causes compared to women of Parity 1–2, whereas women of Parity 0 were 20% less likely to die from ruptured uterus than women of Parity 1–2. The maternal mortality ratio for women of Parity 5+ was 44 per 100,000, compared to maternal mortality ratios of 21 per 100,000 for women of Parity 3–4, 4 per 100,000 for women of Parity 1–2, and 3 per 100,000 for women of Parity 0.

The pattern of maternal mortality by residence was as follows: metropolitan women had the lowest maternal mortality ratio from ruptured uterus (5.6 per 100,000), followed by rural women in lower Egypt (8.10 per 100,000), urban women in upper Egypt (12.3 per 100,000), urban women in lower Egypt (15.8 per 100,000), and rural women in upper Egypt (16.1 per 100,000).

The majority (69%) of the women dying from ruptured uterus had not received any formal education, and women without an education also had a higher maternal mortality ratio (14.6 per 100,000) than women with an education (6.9 per 100,000).

Tables 10 and 11 show the use of antenatal care, the place of delivery, the place of death, and avoidable factors for maternal deaths from ruptured uterus.

Women who had no antenatal care during pregnancy represented 46% of all deaths from ruptured uterus, and lack of or poor quality antenatal care was considered an avoidable factor in 33% of the cases. The comparable figures for all maternal causes of death are 35% and 33%, respectively. Of the 48 women with ruptured uterus, 47 (98%) were seen by a physician at some point immediately around the time of death, and a high pro-

portion of deliveries (50%) and deaths (77%) occurred in government hospitals.

The most commonly identified avoidable factor was substandard care by the obstetric team (73%), a much greater contribution by the obstetric team than that which they made to maternal deaths overall (47%). This is somewhat surprising since delay on the part of the patient or her family did not contribute much (29% compared to 42% for all maternal causes).

The following case history (No. 0126) illustrates some of these avoidable factors in a woman who died from a ruptured uterus:

The woman was 28 when she died, and had given birth to four girls, three of whom were alive at the time of the interview. She had never used antenatal care and none of the pregnancies had caused any problems. This pregnancy also passed without any complications. The labor started in the evening. When she had not delivered by the next morning, her mother-in-law called an ambulance, which took her to the government hospital.

In the hospital an ultrasound was done and the attending obstetrician said that the baby had died. There was generalized abdominal tenderness and no fetal heart sounds, the cervix was 9 cm dilated. The doctors tried to deliver the baby by vacuum extractor but failed. They then tried internal podalic version (pulling the baby out by one of its legs). The baby was delivered, but when they examined the uterus they found the uterus had ruptured, so they proceeded to laparotomy.

The patient had cardiac arrest during the operation. They performed routine resuscitation and cardiac massage, and used intracardiac adrenaline, etc., but the woman died. The obstetricians suggested that they may have missed a ruptured uterus at admission and perhaps should have proceeded to laparotomy earlier.

Cesarean Section

Cesarean sections contributed to 44 maternal deaths, representing 9% of the direct causes and 6% of all maternal deaths. The maternal mortality ratio from cesarean section was cal-

culated as 10 per 100,000. Cesarean section often occurred with other causes of death (N = 32), and was reported to be the single main cause of death in only 12 cases (27%). The main causes of death associated with cesarean section were postpartum hemorrhage (N = 16), antepartum hemorrhage (N = 8), anesthesia (N = 9), and hypertensive diseases (N = 6).

Women aged less than 20 and older women were more likely to die from cesarean section than from other causes compared to women aged 20–29. A similar pattern holds for maternal mortality ratios by age. Since the age distribution of cesarean section rates in Egypt is not known, however, interpretation of these differences is difficult. Cesarean sections performed on women over 35 were associated with other conditions that complicated the case leading to death.

High parity was also a risk factor, and grandmultiparas (Parity 5+) had a maternal mortality ratio of 31 per 100,000, compared to 12 per 100,000 for Parity 3–4, 6 per 100,000 for Parity 1–2, and 7 per 100,000 for Parity 0. Performing cesarean sections on uteruses that have experienced repeated pregnancies could cause further complications.

Upper Egypt appeared to have a higher maternal mortality ratio associated with cesarean section (16 per 100,000 and 13 per 100,000 in urban and rural, respectively) than metropolitan (8 per 100,000) and lower Egypt (6 per 100,000 and 8 per 100,000 in urban and rural, respectively).

Women without an education also had a higher maternal mortality ratio for cesarean section (12 per 100,000) than women with an education (8 per 100,000).

Tables 10 and 11 show the use of antenatal care, the place of delivery, the place of death, and avoidable factors for maternal deaths from cesarean section.

Most of the women dying after a cesarean section had received antenatal care (34/44 or 77%), and women who had no antenatal care during pregnancy represented only 20% of

deaths. Lack of or poor quality antenatal care was also considered an avoidable factor in 20% of the cases. The comparable figures for all causes of death are 35% and 33%, respectively.

All women who had a cesarean section (100%) were attended by obstetricians and delivered in a health facility: 68% delivered in a government hospital, 5% delivered in a private hospital, and 27% delivered in a private clinic. The fact that 32% of women dying from a cesarean section had it performed in a private facility is noteworthy, particularly since, among all maternal deaths, only 84 of the 536 women who delivered (15.7%) did so in a private facility. Possible reasons for this excess of cesarean section deaths in private facilities may include lack of adequate blood and other supplies and equipment, poor anesthesia backup and reluctance to transfer women in a timely manner. It is interesting to note that private practitioners appear to be reluctant to have women die in their facilities. Although 14 women had their cesareans done in private facilities, only 6 died there. The rest were transferred to a general hospital (N = 4), died in transport (N = 6), or were discharged home to die (N = 4).

Substandard care from the obstetric team was the single most important avoidable factor (93% of the cases); traditional birth attendants and general practitioners did not play a role. Lack of drugs, supplies and equipment, and lack of blood were also identified as important avoidable factors (11% and 11% of the cases, respectively) compared to their contribution to all maternal deaths (2% and 6%, respectively).

Indirect Causes

Cardiac Diseases

Cardiovascular diseases of pregnancy are classified as indirect causes of death. Out of 194 indirect deaths, 92 were cases of cardiovascular diseases, representing 13% of all maternal

deaths, and 47% of all indirect obstetric causes. These give a maternal mortality ratio of 21 per 100,000. Of the 92 cardiovascular deaths, 55 were deaths from cardiac diseases, representing 8% of all maternal deaths and 28% of all indirect obstetric deaths; the maternal mortality ratio for cardiac diseases was 12 per 100,000. Rheumatic heart disease with valvular lesion of the heart was the most common type.

Women under 20 years of age and those over 34 were more likely to die from cardiac diseases than from other causes. The maternal mortality ratios for cardiac diseases by age were 30 per 100,000 for women aged less than 20, 6 per 100,000 for those aged 20–24, 14 per 100,000 for those aged 25–29, 13 per 100,000 for those aged 30–34, 18 per 100,000 for those aged 35–39, and 23 per 100,000 for those over 40.

Risks did not differ much by parity, although grand-multiparas (Parity 5+) were 1.5 times more likely to die of cardiac diseases than women of lower parity. The maternal mortality ratio for cardiac diseases was 11 per 100,000 for Parity 0, compared to 12 per 100,000 for Parity 1–2, 13 per 100,000 for Parity 3–4, and 18 per 100,000 for Parity 5+.

There was no clear pattern by residence: women from upper Egypt had a slightly lower maternal mortality ratio (9–11 per 100,000) than metropolitan women (11 per 100,000) and women from lower Egypt (15–16 per 100,000).

Women without an education had a higher maternal mortality ratio for cardiac diseases (14 per 100,000) than women with an education (11 per 100,000).

Tables 10 and 11 show the use of antenatal care, the place of delivery, the place of death, and avoidable factors for maternal deaths from cardiac diseases.

Women who had no antenatal care during pregnancy represented 24% of all deaths from cardiac diseases, but lack of or poor quality antenatal care was considered to be an avoidable factor in 44% of the cases, largely because it was felt that good

antenatal care should have been able to detect rheumatic heart disease. The comparable figures for all maternal causes of death are 35% and 33%, respectively.

Many women (42%) died before delivering; 33% delivered in a government hospital, 4% delivered in a private clinic, and 22% delivered at home. Only 8 of the 55 women with cardiac diseases (15%) were not seen by a physician at some point immediately around the time of their deaths.

The most commonly identified avoidable factors were related to lack of or poor quality antenatal care (44%), and delay in seeking (or noncompliance with) medical care by the patient or her family (65%). Both factors were more likely to play a role in deaths from cardiac diseases than in deaths from all maternal causes, where they were associated with 33% and 42% of deaths, respectively. The role of antenatal care is particularly troublesome since these women were more likely to have sought antenatal care and more likely to have been aware that they had a problem (62%). This suggests that there were either problems with the recommendations given during antenatal care, or that women were unlikely to comply with the recommendations regarding cardiac diseases.

Among the maternal deaths due to cardiac diseases, 18% of the women died before 28 weeks, 24% died undelivered at or after 28 weeks, 13% died during labor, and 45% died in the postpartum period. Deaths from cardiac diseases were much more likely to occur in the woman's home than those from other causes, suggesting a sudden onset of death.

Unknown Causes

For 26 deaths (3.6%) it was not possible to arrive at a reasonable cause of death, either because not enough details were obtained from the family or the physicians involved, because the story was unclear, or because a diagnosis was not possible without an autopsy.

The following case study (No. 1112) illustrates a situation in which it was not possible to assign a cause of death:

The woman had married at the age of 16 and had given birth to three healthy boys; she had one spontaneous abortion. The previous pregnancies had caused no problems. She was using an IUD but she got pregnant while the IUD was in place (contraceptive failure). During this pregnancy, she visited an obstetrician in an antenatal care clinic twice. The reason for her last visit was that she felt that the baby had stopped moving. An ultrasound confirmed that she was 28 weeks pregnant and that the baby had died.

The doctor told her that the delivery needed to be induced the same day. The woman was frightened, however, and waited for another week before going to the hospital (delay). The government hospital was far from her house; it would take about one hour by taxi to get there. When she and her husband finally went to the hospital, it was a Friday and they were told to return the next day.

On Saturday, the delivery was induced by an obstetrician and she was delivered of a dead child. Immediately after the delivery she suddenly collapsed, became cyanotic, and had to be resuscitated. The resuscitation failed. She was aged 25 years old when she died. The reason she suddenly collapsed was unknown. The medical form reported a possible pulmonary embolism but this could not be verified without an autopsy, so the cause of death was left as unknown.

Conclusions and Recommendations

1 Conducting a national confidential inquiry into maternal mortality in Egypt is a major achievement. In Britain and the USA, this type of review has been highly successful in reducing maternal deaths (Tomkinson and Potts, 1983). It is anticipated that our study will have similar results. The confidentiality of the inquiry ensures that no legal or political proceedings may result from the findings, and the absence of blame, recrimination, and censure of individuals means that fuller and more honest reporting occurs. *Therefore, we recommend repeating the study on a regular basis (every three years) to monitor progress in improving maternal health and to increase awareness of the problem. This should be considered part of the continuous medical education process.*

2 Two major avoidable factors emerged from this study: delays on the part of the woman and her family, and substandard care on the part of medical professionals. These two factors are likely to interact, so that delays in seeking medical care complicate the management of the obstetric emergencies presenting at health facilities. To significantly reduce maternal mortality in Egypt, both of these major problems need to be tackled.

However, Maine (1991) argues that, *if possible, first priority should be given to tackling problems occurring within hospital facilities.* This is because many conditions leading to maternal death cannot be addressed at the community level and require essential obstetric functions that are only available at the first

referral level (district hospital) or higher. If these facilities and practitioners are unable to cope with the existing situation, then increasing the demand for such emergency services through community mobilization will only exacerbate the situation. For this reason, addressing the supply side of health care must precede, or accompany, increases in the demand side.

Even in rural Egypt, 98% of women live in villages that are within thirty kilometers of a government hospital, and 48% live in villages with a private physician who does deliveries (DHS: Cairo, 1991). In our study, 70.6% of women attended a health facility at some point during the events leading to their deaths. It is therefore appropriate to start improvements at the level of health services.

3 The study revealed that substandard care on the part of obstetricians contributed to the deaths of nearly half the women (47%). Addressing the problem of substandard care by the medical profession will be difficult and will need to be tackled from various perspectives and through different means.

- *Protocols for the management of common obstetric emergencies* (such as postpartum hemorrhage) *should be developed and used.* Posters with emergency flow charts on how to manage the major killers of women can be designed and distributed (with appropriate training), much the same way posters have been used to manage diarrhea and acute respiratory infections. Kwast and colleagues have designed protocols and flow charts for midwives that can be adapted (Kwast et al., 1994). Topics for further training could include the identification of nonprogressive labor, signs of obstruction, and prolonged third stage with use of the partogram; the need for I.V. fluid replacement; the use of aseptic techniques and regular temperature recording; good assessment of cases of premature rupture of membranes (PROM); suitable antibiotic treatment in cases of cesarean section, heart disease, premature rupture of

membranes, prolonged labor, and diabetes; and aggressive management of acute infections.

- *There is likely to be a requirement for in-service training for obstetricians and general practitioners.* This can be done by providing continuing education and/or refresher training that is practical and skill-based. One possible model is to adapt the "Lifesaving Skills for Midwives" course provided by the American College of Nurse Midwives (Marshall and Buffington, 1991). General practitioners should be trained in first aid for obstetric emergencies, so they can stabilize women arriving at health clinics before referring them on. They also have a major role to play in antenatal care. However, as with many skill-based training programs, appropriate sites for practical training may be difficult to locate.
- Many of the hospital deaths were managed by junior obstetricians, or doctors in training, with limited experience. Substandard care may occur because senior staff are not available at night, or to assist with complicated procedures (El-Mouelhy, 1987). *We strongly recommend that senior obstetricians be more involved in obstetric care, particularly in making early decisions for operative procedures.*
- Our research has demonstrated that confidentiality can be maintained in maternal mortality inquiries in Egypt. Confidential inquiries should be instituted in all teaching hospitals and in at least some government hospitals. If maternal deaths are comparatively rare, hospitals could investigate "near misses" as well as deaths (Stones et al., 1991). Doctors should be encouraged to do operational research on factors contributing to delay in the provision of care as part of their research training.

Because this study focused on individual deaths, the research was less successful at identifying institutional factors contributing to maternal death. Thaddeus and Maine (1990) reviewed the literature and identified many factors contributing to delays in obtaining appropriate care within

hospital facilities. *Hospital audits and time motion studies can be used to identify administrative and management problems.* For example, drugs, equipment, and supplies may be present, but under lock and key or in use on another ward. Lack of protocols may mean that surgical intervention, including hysterectomy to manage overwhelming puerperal sepsis or hemorrhage, is often delayed because no one is prepared to make the decision.

- *The Ministry of Health, with the Medical Schools, should review and reevaluate the postgraduate training programs, particularly the Obstetric Diploma, which lacks practical training.* More practical training may be added, and the examination should be directed toward practical issues rather than theoretical ones. *Teaching hospitals of the Ministry of Health should play a role in such training and qualification.*
- Avenues for working with private doctors, private clinics, and private hospitals, perhaps through the medical syndicate, need to be sought. Our results indicated that 22% of women dying from postpartum hemorrhage had delivered in a private facility. Possible reasons for this excess of postpartum hemorrhage deaths in private facilities may include poor management of the third stage, lack of adequate blood supplies, and reluctance to transfer a patient and lose custom, particularly in small clinics. *Therefore, private clinics should not conduct operative deliveries.* Current legislation requires that operative deliveries occur in licensed clinics; the law should be enforced.
- The results suggested that the traditional birth attendant (daya) training programs conducted by the Ministry of Health and UNICEF are relatively successful in teaching traditional birth attendants to refer women with complications promptly. Traditional birth attendant training programs that discuss complications of pregnancy are already under way, but it would be worthwhile to review the training curricula to ensure that these are as specific and relevant as possible. Considering that 70% of women are de-

livered by traditional birth attendants, it is encouraging to note that dayas contributed to only 12% of deaths. Details of particular problems should be noted, and an emphasis placed on prompt referral in future training. El-Kady and colleagues (1989) furnish a model for such an investigation. *We recommend the daya training programs be continued and strengthened.*

To provide an alternative to deliveries by traditional birth attendants, the Ministry of Health is also exploring the possibility of strengthening midwifery in Egypt. A ministerial decree has been issued licensing midwifery training. A pilot program to train 22 nurses in Menoufia as midwives is due to start soon. *This should be evaluated, and if successful, extended to other governorates.*

4 The second major avoidable contributor to maternal death was delay in seeking care on the part of the woman and her family. The reasons for this delay need to be explored in more depth, using quantitative and qualitative research methods. Khattab (1992) has identified six factors contributing to women's under use of reproductive health services in general: (1) women's culture of silence, (2) the low priority women give to their health status, (3) the effect of women's position in the family hierarchy on health-related behaviors, (4) lack of awareness among women concerning their health, (5) health professionals' patronizing attitude toward women's perceptions of their health, and (6) health professionals' lack of knowledge of the life conditions of patients. *Campaigns should be launched to tackle the issues of women's awareness and health professionals' attitudes.*

- Since most women (72%) were eventually taken to a hospital, distance from medical facilities and lack of transportation (physical accessibility) did not seem to be major factors. Therefore, the reasons for delay or noncompliance are more likely to be because families and women do not recognize danger signs and complications in pregnancy,

because those attending the birth do not have decision making capacities regarding transfer, because health facilities are not judged to be of good quality, or because complying with recommendations is costly (either financially or socially). A previous KAP study suggested that women's perceptions of poor quality services and financial cost are barriers to the use of antenatal and delivery services, respectively (Loza, 1994).

There is also some evidence from our study that delay was caused by the intermediate step of women seeking care from private practitioners who were incapable of dealing with the medical emergency involved, or who delayed transfer to higher level facilities. *More investigation needs to be done to identify the precise reasons for delay.* This can be done through focus group discussions with women and pregnant women. Such research is essential for carrying out community-based interventions.

- Should part of the problem prove to be a lack of awareness of the danger signs in pregnancy, it will be important to communicate with women and their families about danger signs in pregnancy, delivery, and the postpartum so they can receive prompt care. This should be done at all possible opportunities, and should not just be restricted to antenatal care or via traditional birth attendants.

Egypt has successfully used television campaigns for a variety of health problems—consideration should be given to such a campaign on maternal health. The communications strategies used should focus on behavior change and be precise (Winnard, 1994). For example, rather than saying bleeding in pregnancy is a danger sign, the message should say a pregnant woman with any bleeding in pregnancy after 28 weeks should go to the hospital. Similarly, rather than saying retained placenta is a danger sign, the message should say that if the placenta has not delivered within half an hour, a woman should seek care.

Mass campaigns will also mean that messages may reach other key decision-makers in the family, such as mothers-

in-law and husbands. Among other points, public health messages could focus on the following: (1) planned pregnancy, contraception and spacing, correct use of contraceptives, and availability of methods, (2) recognition of early symptoms of pregnancy and the importance of early pregnancy care, (3) treatment of anemia, parasites, and malnutrition, (4) prevention of accidents and burns, and (5) the dangers of pregnancy at very young and old ages.

- Antenatal visits provide a time when women are particularly receptive to messages about pregnancy, and both verbal messages and posters may be used.
- Since they deliver the majority of women in Egypt, traditional birth attendants are another natural target for communications campaigns on danger signs in pregnancy.

5 In Egypt as a whole, great progress has been made with family planning programs, which undoubtedly have reduced maternal deaths. However, according to the families of the deceased women, in roughly 14% of the unwanted pregnancies, the women had not been using contraception. In Egypt, 30% of women who do not want any more children are not using contraception, and only 14% intend to start (DHS I: Egypt, 1989). *Greater effort must be made to reach these women with family planning.*

6 With the possible exception of blood, where shortages contributed to 6% of deaths, lack of drugs and equipment was not a major contributor to the maternal deaths. Nonetheless, the Ministry of Health is upgrading 60 delivery facilities. *It would be ideal if the Ministry of Health could inventory hospitals capable of providing all the emergency obstetric functions* recommended by the World Health Organization (WHO, 1991), *and ensure that these are maintained with sufficient funding in the routine budget to provide for equipment and drugs. Efforts must also be made to maintain adequate blood supplies. Further investigation of the issue of blood supply and ways of maintaining it is needed.*

7 The effectiveness of antenatal care in preventing maternal death is being called into question (Maine, 1991; Rooney, 1992). High risk scoring systems are particularly being called into doubt because of their low predictive value. However, it is certain that antenatal care can detect and treat anemia, hypertensive disease, infections, and other existing conditions and diseases leading to dangerous pregnancy. In our study, the advisory groups judged that antenatal care could have detected the causes in 33% of maternal deaths. In some instances, women attended antenatal care (40%) but did not receive good quality care. *Attempts should be made to strengthen those aspects of antenatal care most likely to have an effect.* Antenatal care can be made more attractive to women by improving clinic waiting areas, and by providing health education and iron and folate tablets. Laboratory services should be upgraded and the antenatal record system improved. Perhaps most important is to ensure a change in the attitudes of health providers toward women.

8 Educated women had a lower maternal mortality ratio for all causes of death examined. The effect of education is probably mediated through other factors including residence, socioeconomic status, and the ability to negotiate good quality care. However, it must be said that general improvements in the health and socioeconomic status of women, including improving female education and combating illiteracy, are also likely to have a major impact on maternal mortality, by empowering women and making them more aware of their health and of how to maintain it. *The "Facts For Life" program initiated by UNICEF (UNICEF et al., 1993) may be an appropriate model of how to include maternal health education in preparatory school curriculums.*

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Appendix 2. Definitions and Abbreviations Used in the Study

ANC	Antenatal care
APH	Antepartum hemorrhage
CAG	Central advisory group: the Cairo-based committee that supervised the study, reviewed all problematic deaths, and assigned a final cause.
CAPMAS	Central Agency for Public Mobilization and Statistics
CAU	Clark Atlanta University
CSP	Child Survival Project
CS	Child Spacing Program
Daya	Traditional birth attendant
C.S.	Cesarean section
DHS	Demographic and Health Survey: a national household survey conducted in 1988 and 1992.
FD	Female deaths: deaths of women of reproductive age (14–50).
ICD-9	International Statistical Classification of Diseases, Injuries and Causes of Death, Ninth Revision
KAP	Knowledge, Attitude, Practice
LAG	Local advisory group: the governorate-level committee, consisting of up to six doctors, that reviewed all maternal deaths, attributed a cause, and listed avoidable factors.
MCH	Maternal and Child Health
MD	Maternal deaths
MMR	Maternal mortality ratio
MOH	Ministry of Health
NGO	Non-governmental organization

ODA British Overseas Development Administration
PAPCHILD Pan Arab Project for Child Development: a national household
survey conducted in 1991.
PPH Postpartum hemorrhage
SHB Selected health bureaus
SW Social workers: trained interviewers from CAPMAS who inter-
viewed all families and dayas.
TBA Traditional birth attendant or daya
USAID United States Agency for International Development
WHO World Health Organization

Appendix 3. Details of the Study Design

Sample

The study was designed as a population-based sample of all maternal deaths over a one-year period in 21 governorates, excluding the five frontier governorates. The exclusion of the frontier governorates was necessary for logistical reasons and because the characteristics of these governorates differ widely from the rest of the country. The people in these governorates are Bedouin, are scattered over very large desert areas, and represent only 1% of the Egyptian population.

Based on 1988 data from CAPMAS, a random sample of 122 health bureaus was selected, which included 28% of all registered deaths of females in the reproductive ages (14-50 years). This sample size was calculated to give precise estimates of the maternal mortality ratio for three strata: upper, lower, and metropolitan Egypt.

Method

The directors of selected health bureaus were asked to report all deaths of women of reproductive age weekly, starting 1 March 1992. Maternal deaths (MD) among these were identified by screening questionnaires at the selected health bureaus: the directors were asked to obtain a correct address and to record whether the deceased woman died while she was pregnant, delivering, or in the period 42 days after the end of pregnancy.

Figure A. Sources of Information Used in the Study

- The woman's relatives including husband, mother/mother-in-law, and sister/sister-in-law
- Any person who witnessed the death
- Traditional birth attendant involved in the care of the woman
- Midwives involved in the care of the woman
- Physicians involved in the care of the woman
- Drug and X-ray prescription forms
- Medical records from MCH units, hospitals, private clinics, and/or health bureaus

The second step was a home interview by professional social workers (SW) from the Central Agency for Public Mobilization and Statistics (CAPMAS), using structured pretested questionnaires with an open-ended section. These involved: (1) a household questionnaire aimed at the husband/mother/sister or any person witnessing the event, and (2) a traditional birth attendant (TBA) questionnaire if one was involved in the case. The in-depth home interview also confirmed that the death had taken place in a pregnant or recently delivered woman.

In each governorate a maternal mortality study committee (Local Advisory Group) was formed, chaired by the Undersecretary of Health in the governorate, and including three senior obstetricians from the governorate; an anesthetic consultant was asked to review all cases where women had received an anesthetic. When the woman had been taken to a physician or health facility, the medical records were reviewed and practitioners interviewed by obstetricians in the Local Advisory Group. All questionnaires and records were then reviewed and a report written identifying causes of death and avoidable factors. Finally, all cases were reviewed by the Central Maternal Mortality Committee (Central Advisory Group or CAG).

Figure B. Summary of the Study Steps

1. Every Monday, each selected health bureau (SHB) receives notification of deaths from different health bureaus in its area.
2. Deaths of females between 14 and 50 years old are identified by SHB Directors.
3. The SHB Director visits the household where death occurred to ascertain whether the deceased was pregnant or died within 42 days of delivery or an abortion. Condolences are given.
4. SHB Directors notify the Local Advisory Group (LAG) at the governorate level.
5. The LAG notifies the social workers (SW) at the governorate level (of maternal deaths only).
6. The SW go to the households for an interview. The interview is with the husband, mother, sister or relative most closely involved. The traditional birth attendant is also interviewed using a separate questionnaire if she is involved. All questionnaires are sent to the LAG.
7. The LAG meets once a week to discuss each case and to identify the causes of death and the avoidable factor or factors. If the causes or factors are unclear, further inquiries are conducted through the SW. If the death occurred in a hospital or private clinic, a representative of the LAG collects the data using a separate questionnaire.
8. The LAGs send all questionnaires and technical documents to the Central Advisory Group (CAG) for review and finalization.
9. Finalized questionnaires are coded and double entered.
10. The CAG organizes training for SHB Directors and the LAGs and gives refresher courses.
11. The CAG receives a monthly report (first week of each month) from each LAG indicating: (1) total female deaths, 14-50, in the SHBs in the study, (2) total maternal deaths, and (3) total number of live births.
12. Analysis and dissemination of the results is the duty of the CAG.

The study was designed to involve the existing system in the Ministry of Health (MOH), with the intent of producing a double effect:

- Repeating the study in a few years (2–3 years) will be feasible and less costly because it will work as part of the MOH system.
- The study will have an educational value, whereby MOH personnel will appreciate the factors and causes that lead to maternal mortality.

Implementation Pre-Test

Interviewers were trained by Dr. Botheina El-Deeb and Dr. Mohammed Hefni at CAPMAS. A pre-test of 25 cases was then conducted in January 1992, covering 5 governorates: Alexandria, Cairo, Fayoum, Beni Suef, and Gharbia. The pre-test was analyzed, and based on the results, certain modifications and adjustments were made to the questionnaires.

Training

Two training courses were conducted: the first on 10 February 1992 for the selected health bureau directors, and the second on 13 February 1992 for the Local Advisory Groups from the 21 governorates where the study was taking place. These two orientation courses aimed to familiarize the MOH personnel involved in the study at the governorate level with the system and the procedures for filling out the forms. The training courses were attended by 122 SHB Directors and 80 LAG members.

Quality Control

Quality control was assured through a number of means. At the SHB level, a copy of the official register of all notifications of death was obtained monthly from each SHB and checked with the forms received from the SHB Directors. All the questionnaires completed by SHB Directors were then checked by

the LAG in their weekly meetings, and incomplete and unsatisfactory questionnaires were returned for amendment.

All questionnaires (including those from the social workers, LAGs, and SHBs) were rechecked by the CAG. In particular, all reports from the LAGs were revised by the CAG before data entry, and unsatisfactory LAG reports were returned and discussed with the concerned group. The CAG also visited different LAGs to check their performance. Payment was made only for questionnaires approved by the LAGs and the CAG.

Two hundred cases were re-investigated by different teams of social workers from CAPMAS. Only 2 cases of maternal deaths had not been detected by the SHB Directors, and both were from the same governorate.

All data were double entered using EPI-INFO, and validation checks were run to detect and correct data entry errors.

As with any new study there were some obstacles and difficulties at the start; however, by three months into the study, the performance of the LAGs, SHB Directors, and social workers had been improved by continuous training and refresher courses conducted by the CAG, and performance was excellent.

Denominators

To calculate the maternal mortality ratio, data on numbers of live births are needed for the denominator. Two sources of data are available. The first, which was used in this report, is the number of live births registered in the same sample of selected health bureaus used to obtain maternal deaths.

The second is to inflate the number of maternal deaths by the sampling fraction and use the total number of live births in each governorate as the denominator. For example, if 25% of all female deaths in Alexandria were sampled, then the number of maternal deaths could be multiplied by four and divided by the total number of live births in Alexandria.

Data for the first option was obtained by having implementation officers collect data on the registered live births in the selected health bureaus; data for the second option was provided by CAPMAS. Comparison of the two methods gives different maternal mortality ratios; further research will be done as to the reasons for this difference.

Appendix 4. Cause of Death Among Women Aged 14–50

Cause of Death	ICD-9 Category	Number	Percent
Infectious and parasitic	I	251	3.8
Neoplasms	II	938	14.1
Endocrine, nutrition, metabolic, and immune	III	236	3.6
Blood and blood-forming organs	IV	41	0.6
Mental	V	24	0.4
Nervous system and sense organs	VI	310	4.7
Circulatory	VII	1978	29.8
Respiratory	VIII	329	5.0
Digestive system	IX	806	12.1
Genito-urinary	X	646	9.7
Pregnancy, childbirth, and puerperium	XI	1	0.0
Congenital anomalies	XIV	3	0.0
Symptoms, signs, and ill-defined	XVI	10	0.2
Injury and poisoning	XVII	1068	16.1
Total		6641	100.1
Missing Cause		21	

Note: This table excludes the 825 women who died while pregnant, delivering, or in the 42 days postpartum.

Appendix 5. Single Main Causes of Maternal Deaths

	Number	Percent of Total
Direct cause	499	69.5
Hemorrhage	212	29.5
Antepartum	50	7.0
Postpartum	161	22.4
Other	1	0.1
Hypertensive diseases of pregnancy	110	15.3
Without convulsion	44	6.1
With convulsion	66	9.2
Genital sepsis	59	8.2
Abortion	32	4.5
Spontaneous	19	2.6
Induced	13	1.8
Other	86	12.0
Ectopic	4	0.6
Ruptured uterus	41	5.7
Obstructed labor	3	0.4
Cesarean section	17	2.4
Anesthesia	13	1.8
Pulmonary embolism	7	1.0
Other	1	0.1
Indirect cause	193	26.9
Anemia	4	0.6
Cardiovascular	92	12.8
Neurological disorders	17	2.4
Infections and parasitic diseases	26	3.6

Digestive	9	1.3
Urogenital	2	0.3
Neoplasms	12	1.7
Diabetes	6	0.8
Other	25	3.5
Unknown cause	26	3.6
Total	718	100.0

- الاستمرار في التدريب للفتات المعروفة على الوضع لتحويل الحالات المرجحة في الوقت المناسب او التعامل معها.
- مشاركة اخصائي التوليد في رعاية الام اثناء الولادة وخاصة فيما يختص باحتجاز القرار المبكر للتدخل الجراحي.
- التعرف على المشاكل الادارية وغيرها بالمستشفيات
- قيام وزارة الصحة و كليات الطب ببرامج تدريج الاطباء بعد التخرج وخاصة بالنسبة لاطباء الدراسات العليا النساء والتوليد و الذين يفتقدون الي هدف التدريب العملي بالمستوى المطلوب
- تنفيذ التدريبات التي تنص على ان عمليات الولادة يجب ان تتم في عيادات مرخص لها و تتوافر فيها الشروط الصحية المناسبة لاجراء تلك العمليات.
- دعم و استمرار برامج تدريب الدابات وهناك برنامج تدريب القابلات بالتدريبية كبرنامج استخلاصي يجب ان يتم تجميعه و اذا تم نجاحه فيجب ان يقد الي باقي المحافظات.
- 4. العامل الثاني الذي يؤدي لوفيات الامهات والذي يمكن تجنبه هو التغيير في طلب الرعاية الطبية و يقع ذلك على كل من الام و الاسرة و لمعرفة اسباب ذلك فيجب دراسة بمق باستخدام وسائل الابحاث الكمية و الوصفية كما يجب ان تبدأ حملات لعت الوعي عند السيدات فيما يختص بالمشاكل الصحية و التي تشمل ما يلي:

- الاستعانة عن الاسباب الحقيقية في طلب الخدمة و لقد اقترحت دراسة سابقة عن المعرفة و الانتخاب و الممارسة ان اطلاع السيدات عن الفوائد الصحية بالاعانة الي التكليف اناية هي الممرات لطلب الرعاية الصحية اثناء العمل بالاعانة الي الولادة في الراكز الصحية.

- لقد قامت مصر باستخدام التليفزيون في انواع مختلفة من الحملات الصحية لذا يجب امتداد ذلك ليضم رعاية الامهات كم يجب ان تركز استراتيجيات الاتصال على تغيير السلوك وعلى ان تكون واضحة.

ان من الاسباب الرئيسية لوفيات الامهات هو النزيف بعد الولادة ٨. ٢٤٪ - النزيف قبل الولادة ١. ٨٪. تسمح العمل ارتفاع ضغط الدم في العوامل ٩. ٧٥٪ - امراض القلب و الجهاز الدوري ٨. ٧٢٪ - حمى النفاس ٤. ٨٪ - انفجار الرحم ٧. ٢٨٪ - العملية القيصرية ١. ٨٪ الاجهز المتناهي ٦. ٢٨٪ - الاجهز المقسوه (التمدد) ٨. ١٪ ولقد برز عاملين كبيرين يمكن تجنبهم و هما التاخير او الالتزام في التقدم للرعاية الطبية وذلك من الام او عائلتها (ويصل ٤٢٪ من الوفيات) وكذلك الرعاية الطبية دون المستوى من جانب فريق التوليد وتمثل ٤٧٪ من الوفيات.

معظم السيدات (٩٠٪) يتم الذهاب بهن الي المستشفى و البعد عن المراكز الصحية ان نقص في وسائل النقل ايظون جزء كبير من وفيات الامهات (٤٪) كذلك فان نقص الادرية و المعدات لا تمثل جزء كبير (٢٪) بينما نقص الدم يمثل ٦٪.

وكان العامل الخامس بالدراسات الذي يمكن تجنبه ١٢٪ فقط من مجموع وفيات الامهات بالرغم من قيامهن بتوليد اعداد كبيرة من الامهات.

و كانت الترهيبات الخاصة بتلك الدراسة كمايلي:

١. تكرار تلك الدراسة بانتظام كجزء من عملية مراقبة وفيات الامهات
٢. اعطاء الازلوبه للمعاكل التي تظهر في المراكز الصحية الخاصة بالولادة وتشمل مشاكل فريق التوليد - اذاره المسقين - الدم - التجهيزات - نقص الادرية.

٣. بالانسبة للرعاية الغير متكاملة و التي يقوم بها الطباء التوليد و التي تشكل حوالي ٤٧٪ من معظم اسباب وفيات الامهات فان الاجراءات الاتية من الممكن ان تحسن من الموقف:

- وضع بروتوكول للتعامل مع الحالات وكذلك التحويل المبكر للحالات العرجة مثل النزيف بعد الولادة

جمهورية مصر العربية وزارة الصحة

البحث القومي لوفيات الامهات في مصر (١٩٩٢-١٩٩٣)

تشمل تلك الدراسة ٧٢ حالة وفاة للامهات في الفترة من مارس ١٩٩٢ الي فبراير ١٩٩٣ بجمهورية مصر العربية من خلال عينات عشوائية من ٢١ محافظة.

ولقد قام بتلك الدراسة البرناتج القومي للحفاظ على حياة الطفل المصري بدعم من كل من وزارة الصحة المصرية بالتعاون مع جامعة كلارك اتلانتا (امريكا) من خلال هيئة المونة الامريكية وشارك في الدراسة جامعة لندن و الجهاز المركزي للتعبئة العامة و الاحصاء و الجامعات المصرية. ولقد تم استخدام نظام التسجيل الحقيقي للتعرف على العينة العشوائية لوفيات الاناث في الفترة المصرية ١٤-٥٠ سنة.

ولقد قام فريق من الاخصائيات الاجتماعيات بمقابلة أسر السيدات اللاتي توفيبن اثناء الحمل او الولادة او خلال ٤٢ يوما بعد الولادة وذلك بغرض تحديد الاسباب و الظروف المحيطة بكل وفاة.

ولقد كان الوجة الفريد لتلك الدراسة هو استكشاف العوامل التي يمكن تجنبها و التي تحدث في المراكز الصحية او في المنازل او اثناء النقل ولقد تم تشكيل لجنة لدراسة وفيات الامهات في كل محافظة (٢١ محافظة باستبعاد المحافظات النائية) و ممعت فريق من اعضاء هيئة التدريس بالجامعات و الاخصائيين بوزارة الصحة.

ولقد تم اعداد تقرير ميدني للنتائج في ابريل ١٩٩٤ وكانت نسبة وفيات الامهات ٧٤ حالة وفاة لكل ١٠٠٠٠٠ مولود حي. ان هذه النسبة تعتبر اعلى من الرقم الرسمي الصادر من الجهاز المركزي للتعبئة و الاحصاء ولكنه يتماشى مع تقارير الدراسات التي تمت في القرى و المحافظات النائية.

المجلس القومي للسكان



المقرر أ. د. / ماهر مهران

الاخ العزيز

الاستاذ / مصطفى القصاص

تحية طيبة وبعد ...

اود ان ابعث لسيادتكم بخالص شكرى وتهنئتى على العمل العظيم الذى
قمتم به مع مجموعه من العلماء بدراسه اسباب وفيات الامهات فى محاولته
جماده للوصول الى خفضها بما يلحق بمصر والمصريين .

وتفضلوا بقبول اطيب تحياتى وتعظيم شكرى

الاستاذ الدكتور / ماهر مهران

تحريرا فى :- ١٩٩٣/١/١٤

ص. ب. ١٠٣٦ القاهرة تليفون ٣٦٣٨٢.٧ تالكس ٩٤.٨٦ اسرة القاهرة فاكس ٣٦٣٩٨١٨

February 13, 1993

Dr M. A. Kassas
Executive Director,
Child Survival Project,
1 Abdel Mageed El Ramaly St.
Bab El-Louk, Cairo.

Dear Dr Mostafa

re: The first six months interim survey report

Thank you so much for sending me this report on the National Maternal Mortality Survey.

I enjoyed reading it and I would like to congratulate you and the team on a job well done. I look forward to receiving the subsequent reports, and more importantly to seeing actions that will be taken on the basis of the survey.

Please give my best regards to Dr Mohammed Hefny.

With best wishes for a successful project.

Yours truly

M F Fathalla
P.O.Box 30, Assiut

MCH.5/7
M2/62/2-EGY

١٢ أيار/مايو ١٩٩٤
٢ من ذي الحجة ١٤١٤

الأخ الكريم الدكتور مصطفى القصاص.

السلام عليكم ورحمة الله وبركاته، وبعد، فأتشرف بالإشارة إلى الرسالة التي بعثتم بها إلينا في ١١/٣/١٩٩٤، والتي أرفقتم بها التقرير الابتدائي حول الدراسة الوطنية لوفيات الأمومة في مصر، خلال السنتين ١٩٩٢-١٩٩٣.

وأود أن أهنئكم على ما بذلتموه من جهد من أجل التوصل إلى هذا المعدل التقديري الشامل لوفيات الأمومة في جميع المحافظات. هذا، وقد قدمت المعطيات (البيانات) التي استقيتموها، معلومات مفيدة لتخطيط تدابير واقعية وعملية لتحسين الوضع، في إطار استراتيجية الأمومة الآمنة في مصر.

وتفضلوا بقبول فائق الاحترام،،،


حسين الدكتور حسين شهاب الرزاق الجزائري
المدير الإقليمي

السيد الدكتور مصطفى القصاص
المدير التنفيذي لوحدة العناية بالطفل
وأساليب التوليد
مشروع الحفاظ على حياة الطفل
١ شارع عبد المجيد الرمالي
باب اللوق
القاهرة
مصر