PN-ACJ-795

Selected Research Studies

on

Maternal, Perinatal and Neonatal Health

in Egypt

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SUMMARY OF RECENT RESEARCH ON MATERNAL AND NEONATAL HEALTH IN EGYPT

Study Or Report Title Conducting Organization	Study Location And Period Conducted	Study Objectives	Findings	How has the data been
Perinatal/Neonatal Mortality and Morbidity Study: Preliminary Results. (AUC3*) *Ray Langsten, AUC*	- Minya and Qaliubia - 1997-98	Assess morbidity and treatment among a representative sample of neonates.	- The first thing the baby was given was sugar water. Some mothers waited hours and others days to start breast-feeding. - Many of the neonates received treatment at home, and it is almost always the mother who takes care of the baby.	- Development of the natio strategy, target group ide and selection of key mess newborn care.
Diagnosis, treatment and outcomes among neonates admitted to neonatal units of Luxor and Aswan hospitals. (AUC4*) *Ray Langsten, AUC* *A. El-Mohandes, GWUSM*	- Luxor and Aswan - 4 months 1998	Analyze admission characteristics and assess clinical management of newborns in neonatal care units.	- Delivery at the health facility facilitates access to NCU. - Younger and older mothers, with lower education are less likely to take their babies to an NCU. - Inaccurate classification of LBW and VLBW. - Under-utilization of diagnostic tests. - Cause of death assignment was poor. - No discharge criteria or follow up plan. - Low compliance with aseptic procedures.	- Development of the Perinatal/Neonatal Health particularly in how to imp access to NCU care. - Development of the neona training curriculum with f accurate diagnosis and tre standard protocol. - Development of the super training program and QA to target these weak areas. - Development of MHIS m tool for NCU care.
Observations in the neonatal unit in Luxor and Aswan: Preliminary results. (AUC5*) *Ray Langsten, AUC*	- Luxor and Aswan - 1 month 1998	To observe and monitor if aseptic procedures are being followed and maintained in the unit, especially when neonates are handled and/or treated.	- Compliance with aseptic procedures is very poor in both units by all personnel. Only 7% and 33% of physicians in Luxor and Aswan, respectively, washed their hands before examination of a newborn.	- Development of the neona training curriculum for ph and nurses with strong foc infection control practices - Development of the super training program and QA to target infection control procedures.

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Prospective birth and death rates in Minia and Qaliubia. (AUC6)	- Minya and Qaliubia - 1995-96	Determine birth and perinatal, neonatal, infant and child death rates in the two governorates.	- As expected, Minya (representative of Upper Egpyt) had substantially higher rates than Qaliubia except for perinatal mortality.	- Methodolgy considered i design of the 1999-2000 Maternal/Perinatal/Mater mortality survey. - Useful as comparative da other UE governorates.
Perinatal/neonatal mortality and morbidity study: Results of the quantitative component. (AUC7*) *Kathryn Yount, JHSHPII* *Patricia Mechael, JHSHPII* *Ray Langsten, AUC*	- Minya and Qaliubia - 1998	Assess pregnancy-related preventive health practices, behaviors of other household members, use of health facilities, and knowledge of maternal symptoms and treatment.	- A high proportion of pregnant women have access to public or private providers. - Public facilities need to improve ANC services to attract women including full exams, regular availability of supplies (especially TT) and provision of helpful information. - Poorest and least educated women have more internal and external barriers to using care, and they have the least access to good health information.	- Development of the natio strategy, target group ide and selection of key mess maternal health and pregn danger signs. - Information used in the H Provider "sensitization" s - Development of the comn IEC program.
Situational Analysis Of Perinatal Mortality In Egypt. (OTH1) *Bonita Stanton, UMAB*	- Literature review - 1997	Review what is known about perinatal and neonatal health in Egypt.	- Good obstetric and neonatal care would ultimately reduce deaths. - Current NNMR is underestimated - Marked geographic differences in NNMR. - Mother age, education, location, order of pregnancy, nutrition, interval between pregnancies, and adequate antenatal care have an effect on neonatal mortality and morbidity. - No available data on LBW. - No data regarding neonatal cause of death.	- Used in the development Maternal/Perinatal/Neonat Mortality Survey. - Background information f Perinatal/Neonatal Health - Designing the Odeysat demonstration project.

Rates of and Factors Associated with Morbidity and Mortality among Egyptian Neonates and Infants: A Longitudinal Prenatal and Postnatal Study

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ABSTRACT

Two-thousand, twenty-five women who were pregnant during a two year period from mid-1994 though mid- to late-1996 were interviewed about a total of 2128 pregnancy outcomes, after giving birth. Among these women, who were from a representative sample of households in two Egyptian governorates, 181 experienced an early fetal death, 34 had stillbirths, and 1908 had a live birth. Among the live births, there were 35 neonatal deaths and 42 post-neonatal deaths.

This paper will report on the vital rates computed from longitudinal collection of births and deaths during a one year period in 1995-1996. It will then describe the pre-, intra-, and post-natal care received by a larger sample of women who gave during a two year period from 1994 through 1996. A high percentage of women sought prenatal care, beginning early in pregnancy, from both government health facilities (GHFs) and private physicians. Problem-based care was typically directed to private physicians while routine care (precipitated by, and largely limited to the receipt of tetanus toxoid) was directed to GHFs. Diagnostic procedures were not routinely performed at GHFs. Women recognized symptoms which may be associated with adverse outcomes, but health-seeking based on this recognition was inconsistent. Most deliveries were conducted by Egyptian traditional birth attendants (dayas) and were conducted in homes. Anesthesia and medications to accelerate labor are commonly administered by all types of practitioners in home deliveries.

Finally, we will present data on correlates of the pregnancy outcome, and of perinatal, neonatal and post-neonatal mortality. Perinatal mortality was midrange by global standards, with most deaths occurring at home rather than in hospitals. Although care was sought for most infants with diarrhea, respiratory symptoms and fever, neonates with these symptoms

were rarely administered ORS or antibiotics.

INTRODUCTION

Perinatal mortality globally and in Egypt

The Global Situation: Perinatal, neonatal, and infant health reflect maternal health and the quality of care received by the mother during pregnancy, as well as the care received by the infant after birth. In turn, health status early in life influences the health and development of the child for the duration of his or her life. With the increased attention by global policy-makers worldwide on healthy mothers and children, morbidity and mortality during the first year of life have become a main focus of health professionals around the world.

Perinatal mortality (death occurring after the twenty-second week of gestation through the end of the first week after birth) and neonatal mortality (deaths occurring during the first 28 days after birth) each account for approximately one-third of all deaths occurring during the first year after birth. *(1)* The global perinatal death rate has been estimated to be 43 per 1000 births, ranging from 9 in North America to 88 in Western Africa. *(2)*

Numerous interventions have been undertaken globally to improve birth outcomes for both the mother and infant in developing countries. Depending on the socioeconomic development of the country and existing infrastructure, these interventions have generally focused on the community-based system for home delivery (e.g., training of traditional birth attendants) and/or the development of a tiered, referral system within the formal health structure. Although few of the studies have employed a randomized controlled design and the descriptions of the interventions are frequently vague, the literature does suggest that interventions can make a difference. In general, however, mortality rates in the perinatal and early infant periods are slower to respond to improvements in the health care system than are mortality rates in later childhood. *(1)*

The Egyptian Situation: There have been appreciable declines in the under 5 mortality rate (e.g., deaths in the period from birth until exact age 5 years) in Egypt over the past two decades. (3) The most impressive decline has been among children after the first year of life; while twenty years ago the mortality rate for children aged 1 through 4 years was 113 per 1000, now the mortality for this age group is only 19 per 1000. By contrast, mortality during the first year of life has been reduced by only one-half during this same period of time. (3) As has been seen in other developing countries undergoing transition, neonatal mortality is responsible for an increasing percentage of childhood mortality in Egypt. For example, 20 years ago neonatal mortality contributed 27% of all under-fives deaths, while neonatal mortality during 1985 to 1993 accounted for 37% of deaths in this age group. Data are not available in Egypt regarding perinatal mortality rates. (3)

Factors influencing rates

A growing international and national (Egyptian) literature exists with regard to some of the factors influencing neonatal and infant morbidity and mortality. Maternal education, both globally (4) and in Egypt (3) is inversely associated with neonatal, infant, and childhood mortality. High (greater than 35 years) and low (less than 20 years) maternal age are also associated with higher mortality rates among neonates, infants and children. (1, 3) While male deaths are more common in the neonatal period, in many parts of the world (5) including Egypt (3), female deaths predominate subsequently. Both worldwide and in Egypt. first born and later born (e.g. birth order of 4 or greater) experience higher mortality. (1, 3) Prior fetal loss is associated with higher rates of neonatal mortality both globally and in Egypt. (1, 3) Longer birth intervals are inversely associated with mortality. (1, 3) Finally, maternal death is associated with high rates of perinatal death worldwide. (6) In Egypt, in a national study

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conducted among 772 maternal deaths, 57 percent of infants died close to or during the neonatal period. (7)

At the same time, there is much that remains unanswered regarding causes of neonatal and infant mortality in many countries, including Egypt. For example, globally, the most significant factors affecting mortality during the perinatal and neonatal periods are gestational age and birth weight; of these, birth weight appears to be the more important determinant. (8) Infants with birth weights of less than 2500 grams or over 4000 grams experience dramatic increases in early mortality. However, little is known regarding the association of birth weight and/or gestational age and subsequent mortality in Egypt. Likewise, given that perinatal and neonatal health reflects the health status of the mother and the obstetric care received, it is logical that the receipt of antenatal care and attended deliveries should be associated with improved perinatal outcomes. This association has been noted in multiple settings, (9, 10, 11, 12), but has received little attention in the Egyptian context. Indeed, little is known in general regarding actual mortality rates among Egyptian neonates and infants and even less regarding causes of mortality in this age period. Virtually no data exist regarding health seeking for neonates and infants.

Purpose of the present study

While globally many questions remain regarding perinatal mortality, for developing and transitional countries such as Egypt, the void of information on which to build prevention and treatment interventions is even more apparent. Accordingly, in the present paper we report on: 1) Mortality rates during the first year of life; 2) Maternal antenatal and delivery care; 3) Symptoms preceding deaths during the neonatal period and infancy; and, 3) Health seeking and during fatal illnesses in the neonatal period.

Materials and Methods

The data for this study are from a representative multi-stage clustered sample of households in two Egyptian governorates–Minya and Qaliubia–chosen arbitrarily by the Ministry of Health. Minya was selected to represent poorer, more traditional Upper Egypt, while Qaliubia represents wealthier, less traditional Lower Egypt, and includes some of the northern suburbs of Cairo. Sample households were distributed in 50 villages and shiakhas (an urban administrative unit) in Qaliubia and 38 villages and shiakhas in Minya. (The Minya sample originally included 50 villages and shiakhas as well, but, because of political unrest, it was not possible to work in two districts of Minya, where 12 sample areas were located.) Two clusters were selected in each village and shiakha, and 30 sequential households were selected in each cluster in Qaliubia, 40 households in each cluster in Minya. A baseline survey conducted in all sample households in mid- to late-1995, included 3067 households in Minya and 3018 households in Qaliubia. The households were then followed 4 times, at roughly 3 month intervals, for a total prospective period of one year. Over the course of the study, a total of 6296 households were included in the research.[1] All ever-married women

[1] The original study was designed to include a basic sample of 6000 households (30 households in each of 2 clusters per village, equals 60 households per village; times 50 villages per governorate, equals 3000 households per governorate; times 2 governorates, equals a total of 6000 households). However, the exclusion of 12 villages from the Minya sample (at the order of the security forces in Minya), forced us to increase the number of households per cluster in the remaining villages and resulted in a base number of households of 3040 in Minya. Other factors increased the number of households in the sample. For example, if the interviewers found 2 households where the listers thought just one to be living, both households were included in the sample. And households that left the sample over the course of the prospective year, whether by refusing to continue to participate, or by out migration, were replaced by subsequent households from the original listing. Thus the total number of households included grew over the course of the research.

under 55 years of age in the sample households were included in the study. Over the course of the 5 rounds 6284 such women were interviewed.

Verbal informed consent was obtained from all respondents. The protocol was approved by the Johns Hopkins University Institutional Review Board.

The baseline questionnaire included a retrospective pregnancy history that recorded all pregnancies the woman had had, whether they ended in early fetal mortality, a stillbirth, or a live birth. In addition, at the baseline and at each subsequent follow-up interview, all eligible women were asked about their current marital, pregnancy and contraceptive status. If a woman reported being pregnant (or was uncertain of her pregnancy status) at any of these visits, the duration of pregnancy or duration since her last menstrual period was recorded. This record was available to the interviewer so that inconsistencies in the woman's report at subsequent rounds could be checked. In the absence of a current pregnancy, the interviewer asked if any pregnancy had ended since the interviewer's previous visit--even if no pregnancy had been reported in the previous rounds. A number of births were identified even though no previous pregnancy had been reported. Most of these were abortions taking place before 6 months of gestation, but a few were live, term births for which the woman had failed to report the pregnancy in previous rounds. All pregnancy outcomes were recorded, whether the result was a live birth or not.

A birth questionnaire was administered for all pregnancies that ended during the prospective year, or in the 12 months prior to the baseline survey. These latter pregnancy outcomes were identified using the pregnancy history included in the baseline questionnaire. For each pregnancy, detailed data were gathered regarding all symptoms and problems and health-seeking behavior during the course of the pregnancy, as well as details regarding the labor and delivery. Likewise, information was asked about the infant at the time of birth, and

about post-natal signs and symptoms experienced by the infant, and any encounters with the health care system during the first 40 days after birth.

The study also recorded all deaths. Deaths to individuals recorded on the household listing were noted through the use of questions on "household change" in each round. That is, for each person recorded on the listing, the interviewer asked if that person was still in the household. If not, had the person died, or migrated out? Then the interviewer asked if there were any new members of the household. If so, were they in-migrants, or had they been born into the household? Not all deaths, especially to young children, occurred to individuals recorded on the household listing. Many of the deaths to very young children were of children born after one round who died before the next. These deaths were noted on the woman's current status form. If a woman had been pregnant, but was not currently pregnant, and no newborn was recorded on the household listing, the interviewer probed for a birth that had subsequently died before the interviewer visit.

For all deaths to children under 5 years of age, a verbal autopsy was completed. The verbal autopsy began with some basic questions about the death, and open questions to establish the course of the fatal illness and its treatment. There were then modules for specific symptoms the mother may have noticed, and a final section of closed questions asking about sources of care of the fatal illness.

For purposes of this study, the following definitions are used. "Perinatal" refers to the period from 6 months gestation up through the first 7 days after birth. (A more rigorous definition of perinatal mortality is not possible, since we have to rely on the woman's retrospective report of the duration of her pregnancy.) "Neonatal" refers to the period from birth through the first 28 days of life. "Postneonatal" refers to the period from day 29 to exact age one year; this can also be referred to as age 1-11 months. "Infancy" refers to the period

extending from the day of birth to exact age one year. [Additional details regarding materials and methods are available from the author (see references 13-15).]

Results

A total of 6284 eligible women were interviewed, among whom 2025 completed a birth questionnaire. Basic data for these women are shown in Table 1. The women for whom there are birth questionnaires are substantially younger, and somewhat better educated than the sample of women as a whole. These women who had a pregnancy outcome during the prospective year or in the year before the baseline, have had fewer births and fewer live births that died. And they currently have fewer living children and fewer living sons. All of this is expected. What is unexpected in this table is that the women who have a birth questionnaire are more likely to come from families that have a per capita monthly family expenditure of less than 50 Egyptian Pounds, and that own no consumer durables, from among the list used to create our scale[2].

Among the 2025 women for whom there is at least one pregnancy questionnaire, there were 2128[3] pregnancies including 1908 live births during the approximately two year period covered by the prospective year and the year preceding the first round of the survey. Among

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[2] The consumer durable variable consists of 6 items: washing machine (owned by 63.2% of households), stove (53.5%), refrigerator (43.9%), color TV (31.0%), hot water heater (16.2%), and video (4.1%). Note that all of these are major appliances, because the index is an attempt to measure wealth. As a result, a large proportion of all household (32.0%) have none of these items, and just 3.4% of households have all of them. The index scales households quite well, however.

[3] There are more pregnancy outcomes, and pregnancy questionnaires than there are women with at least one pregnancy questionnaire because some women had two or more pregnancy outcomes during the period in question. This was particularly true of women who experienced multiple early fetal losses during this period. In cases where a woman reported more than one abortion during the year prior to the survey, she was interviewed only about the most recent of these events. We assumed that it would be difficult for any woman to recall specific problems, treatment, etc. relating to multiple events of this type.

the live births, 922 were female and 986 were male. The sex ratio of 1.07, is within, but at the high end of, the normal range seen world wide.

Among the pregnancy outcomes reported in the pregnancy history of the baseline questionnaire, many dates of birth were incomplete. In many cases it was impossible to know whether a pregnancy outcome occurred during the year prior to the baseline or not. An arbitrary selection of these outcomes were included in the study. However, it was thought best to exclude all births from the year prior to baseline from the computation of vital rates. Therefore, all reported birth and death rates are based solely on the subset of outcomes that occurred during the prospective year. We chose this approach because we wanted the rates to be as accurate as possible, given sampling error. To the extent that the last round of interviewing took place more than one calendar year after the baseline survey, the number of events was adjusted to compensate for the difference. That is, the exact date of the baseline survey was noted. Any event occurring on the one year anniversary of that date or later, but before the last round interview was excluded from the computation of vital rates. After all events were checked and adjusted, there were 589 live births in the sample households in Minya and 365 live births in the study households of Qaliubia, giving respective crude birth rates of 34 and 24 per 1000 population. Total fertility rates were 4.77 for Minya and 3.27 for Qaliubia. [For a detailed description of how these rates were calculated, and indeed, for how all the birth and death data were handled, see (14).] The mortality rates for the two districts are presented in Table 2. The perinatal mortality rates of 30 to 39 in the two districts are midrange by global standards. Neonatal deaths account for approximately one-half of all deaths during the first year of life. In Qaliubia the neonatal rate exceeds post-neonatal mortality, while in Minya the pattern is reversed, with the post-neonatal mortality rate higher than the neonatal rate.

The subsequent analysis is based on the full sample of 2128 pregnancies.

Mothers

Prenatal Care:

From where and whom is prenatal care obtained? What factors determine the source of prenatal care? When does care occur? (See Table 3.)

Table 3 is divided into 3 panels. In the first panel, the data by age show that mothers older than 35 years were the most likely to have received no care, while mothers under age 25 were the most likely to receive care, though the difference between them and mothers aged 25 to 34 years is small. Overall, in the total line, 78% of women received some prenatal care; 21% attended a Government Health Facility (GHF) only, 23% went to a private doctor only, and 33% sought care from both.

In the second panel of Table 3 are data on the relationship between duration and outcome of pregnancy, and the source of prenatal care. Women experiencing a fetal loss before the sixth month of gestation generally received no care (44%) or care only from a private physician (44%). However, among those women whose pregnancy lasted for at least six months only 21% of those experiencing a fetal loss received no prenatal care, about the same as among those women whose infant subsequently survived at least the first month of life (20%). The mothers of infants who died during the first month of life were the most likely, among those whose pregnancies lasted at least 6 months, to receive no prenatal care (31%). Note, moreover, that within each outcome group (fetal loss, neonatal death, survivor) those pregnancies lasting to term (9 months) are somewhat *less* likely to have had prenatal care than are those whose pregnancies ended early.

Finally, the last panel of Table 3 shows the timing of the first visit the woman made to any source of care and the mean number of visits made, by source of care used. Among those

who went for any prenatal care, 80% made their first visit during the first 5 months of pregnancy, with 49% of all women making this first visit during the first trimester. Note particularly, however, the columns for Doctor Only and for GHF Only. Women tend to make their first visit to a private doctor during the first trimester of their pregnancy, while they tend to make the first visit to a GHF in the fourth or fifth month. And those going to a private doctor make, on average significantly more visits, than those going to a GHF.

Among women seeking care from a GHF, 78% went for routine care and 22% for a perceived problem. By contrast, only 21% of those seeking care from a private doctor went for routine care while 79% went for a problem. Irrespective of the outcome of the pregnancy, women going to the GHF tend to go for routine care (primarily a tetanus vaccination), while those going to a private physician tend to go for care of a perceived problem. (Data not shown.)

What problems are women reporting in the last month of their pregnancies? For which of these problems are women seeking care?

Symptoms experienced by women in the last month of pregnancies and sources of care used for these symptoms are summarized in Table 4. As shown in the first column, abdominal pain and headaches (each experienced by about one-third of women) and swelling of the extremities (experienced by one-quarter of women) were the most frequent complaints overall. However, as seen in the last column, more than one-half of women experiencing these problems sought no medical attention. By contrast, among the approximately 7% of women experiencing bleeding, three-quarters sought medical attention. Likewise, among the approximately 16% experiencing fever, over one-half sought medical care. For each condition, women were substantially more likely to seek care from a private physician than from a GHF alone or from both a GHF and a private doctor.

As shown in Table 5, birth outcomes differed on the basis of a few of the maternal problems experienced in the last month of pregnancy. A somewhat higher percent of women experiencing a fetal loss, whether before or after 6 months gestation, suffered from abdominal pain (43 and 41%, respectively) compared to less than one-third of those delivering live infants. Bleeding was very common among women experiencing an early (before 6 months) fetal loss (60%), but not among those whose experienced a stillbirth (10%). In the case of all outcomes (fetal loss, neonatal death, and survivor) women who experienced a premature birth (6-8 months) were more likely to experience bleeding than were those who carried the fetus to term (9 months). By contrast "swelling" was less frequent among woman suffering an early fetal loss or a stillbirth (3 and 16%, respectively) than among women delivering a live infant, whether or not that live birth survived the first month of life (26 and 30%, respectively). With the exception of abdominal pain and bleeding, mentioned above, symptoms did not differ substantially between women whose children did and did not survive the neonatal period.

What services are provided during prenatal visits? Do the services offered differ on the basis of type of health facility (e.g., private versus government) or the reason for the visit? Is the outcome of the pregnancy related to the type of health facility and services received?

As shown in Table 6, women seeking antenatal care from private physicians were more likely to receive diagnostic and/or screening procedures than women attending a GHF. This difference was statistically significant for six of the seven diagnostic/screening procedures assessed (blood pressure, weight, abdominal exam, leg exam, fetal heart and urinalysis). In a number of cases (blood pressure, abdominal exam, and fetal heart) the likelihood of receiving a particular procedure is very much greater from the private physician.

Education regarding breast-feeding was also more likely to occur at private physician's offices. By contrast, women attending GHFs were significantly more likely to receive tetanus toxoid than women receiving antenatal care from private physicians.

As shown in Table 7, mothers attending GHFs whose pregnancy ended in a fetal loss were less likely to receive any of the diagnostic/screening procedures than women delivering liveborns. However, among women having a live birth, those whose infants died in the neonatal period were more likely to have received each of the diagnostic/screening procedures than women whose infants survived the first month of life. Among women seeking care from a private doctor, diagnostic/screening procedures did not vary in any consistent pattern by birth outcome. Women whose infants died in the neonatal period, however, were somewhat more likely to have received one or more of the seven diagnostic/screening procedures than women whose infants survived the first month of life.

While procedures were less commonly performed at GHFs than at private facilities, and women more commonly sought care for perceived problems from private physicians, women who did present to the GHFs with a problem were more likely to receive a service or procedure than women who presented for a routine visit. (See Table 8.) The smallest differentials show those seeking care for a problem about twice as likely to receive procedures (weight, blood sample) as those coming for a routine visit. But for several procedures (palpate abdomen, check legs, check fetal heart) those presenting for a problem are 5 to 7 times as likely to be checked as those coming for a routine visit. The only procedure not following this pattern was immunization with tetanus toxoid, which was administered almost twice as frequently during routine visits compared to problem visits.

This phenomenon was not apparent at private facilities. But, with only a few exceptions (weight, blood sample, urine sample, and, of course, tetanus immunization)

women who went to a private physician, irrespective of whether they went for a problem or a routine visit, were more likely to receive each procedure than the women who went to the GHF for a problem. For example, though women who went to the GHF for a problem were almost 4 times as likely to have their blood pressure taken as those who went to the GHF for a routine visit, even women who went to the private physician for a routine visit were about 1.5 times as likely to have their blood pressure taken as women who went to the GHF for a problem.

Labor and Delivery:

Who attends deliveries?

As shown in Table 9, "dayas" (e.g., Egyptian traditional birth attendants) were both present at and responsible for more deliveries than either doctors or nurses. Dayas were present at 63% of all deliveries, but they were the health worker responsible at just 82% of these deliveries. Thus they were responsible for 52% of all deliveries. Of the dayas, 61% were said to be trained and 47% were noted by the mother to have had "Certificates of Training." Sixty-four percent of the dayas changed their shoes before the delivery, although only 35% changed their clothes. Also shown in Table 9, physicians were present at 32% of deliveries, but responsible for a much larger share of the deliveries they attended. Nurses were present for 18% of the deliveries; and responsible for 65% of them, or 12% of total deliveries. Less than one percent of deliveries were unattended, but in almost 8 percent of deliveries no health worker (daya, nurse, doctor) is said to be responsible for the delivery, or the person responsible is unknown. For the most part, birth outcomes did not vary by attendant, although physicians were somewhat less likely to attend births that survived the first month of life.

Almost three-quarters of deliveries occurred in a home, mainly in the woman's own home, though also in other homes. Very few births take place in government health centers, but substantial proportions do occur in both government and private hospitals/clinics. (See Table 10.) Physicians supervise virtually all (95%) of the hospital deliveries[4]. Not all of the deliveries for which a physician was responsible took place in a hospital, however. Of the deliveries for which a physician was responsible, 99 (17%) took place in a home, either of the woman, or of someone else. On the other hand, 96 percent of all deliveries for which a nurse was responsible took place in a home, while effectively all the deliveries for which dayas were responsible were done in homes. Sixty-one percent of all deliveries occurred in rooms described as "well-lighted".

What problems were encountered during labor and delivery? What procedures/medications were provided? Did these differ by site of delivery or care-giver?

According to the reports of the mothers: Eight percent of all deliveries lasted more than 24 hours, 24% percent of women reported unclear amniotic fluid, 2% percent reported abnormal presentations, and an additional 2% reported a prolapsed cord. Six percent reported

[4] Most of women who did not say a physician was responsible for their hospital delivery, gave no answer to the question of who was responsible for the birth. A few (2%) of hospital deliveries were said to be supervised by a nurse, while the two hospital deliveries said to be the responsibility of dayas are almost certainly errors of some form.

serious bleeding during delivery and 18% reported it after delivery. Three percent reported a seizure, 6% high blood pressure, and 5% a rectal tear[5].

[5] All of these items are self-reported by mothers, the vast majority of whom have no technical training. It appears that some of these items may be over-reported. However, we have no way of assessing the accuracy of the mother's reports. We do know from other studies that mother's reports of serious complaints are often over reported. For example, in studies of morbidity among children under 5 years of age, we find that symptoms of "very severe disease" (unable to suckle or drink, difficult to wake) are clearly over reported (16). So, seemingly are signs of pneumonia such as "fast breathing" and "chest indrawing" (15).

Overall, 96% of deliveries were vaginal, (of these 5% were reported to have included use of forceps and 4% use of vacuum extraction) and 4% were by Caesarean-section. Medicines to speed delivery are reported to have been used in 45% of all deliveries, while 35% of deliveries are reported to have involved the use of an anesthetic. All of these interventions are more commonly performed/used by physicians than by nurses or dayas[6]. However, nurses, and even dayas, were reported to have used forceps, anesthetics and medicines to speed the delivery[7]. (See Table 11.) There is no evident relationship between the use of forceps and vacuum extraction and the outcome of the delivery. Use of medicines to speed delivery, however, is associated with fetal loss, while use of anesthetics is higher among those mothers experiencing both a fetal loss and a neonatal death than in those whose infant survives the neonatal period.

Overall, more than a third of the women did not know what type of instrument was used to cut the cord. Among those who did know, the two most commonly used instruments were a scissors or a blade. Blades are preferred by dayas, scissors by nurses, though both instruments were commonly used by both types of health worker. Almost two-thirds of women delivered by a doctor did not know what type of instrument was used, but among those who reported knowing, almost all said a scissors. Interpretation of the relationship between the instrument used to cut the cord, and the outcome of the delivery is complicated by the high percentage of women answering "don't know", and by the relationship of

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[6] The one report of a Caesarean delivery by a daya, and even the few cases of use of vacuum extraction by dayas (6) and nurses (1), may be errors on the part of the woman or interviewer. The use of forceps, anesthetics and medications to speed delivery, however, though perhaps over reported do reflect known behaviors on the part of these health workers.

[7] We did follow-up interviews, with both women who had given birth and with dayas, about the use of medicines to speed delivery. While their use by dayas may be somewhat over reported, it is clear that dayas do use these medicines in the woman's home. [See (13), and below.]

outcome to health worker used. The instrument used in cutting the cord was cleaned by boiling (36%) or alcohol (8%) most frequently and by soap or water (1%). In most cases when a blade was used, the blade was reported to be new. In 5% of cases the instrument used to cut the cord was reported to have not been cleaned.

Forceps, vacuum extraction, medicines to speed delivery, and anesthetics are all significantly more commonly used during hospital deliveries than when the delivery takes place in a home. (See Table 12.) Because home deliveries are much more common than hospital deliveries, however, for all of these procedures except vacuum extraction, about half of the time that forceps, medicines to speed delivery, or anesthetics were used, they were used in a home delivery. As noted above, about 17 percent of the deliveries for which a doctor was responsible took place in a home. In the last two columns of table 12 we look at those deliveries for which a doctor was responsible, and compare the use of special procedures by whether the delivery took place in a home or in hospital. With the exception of vacuum extraction (which is significantly more likely to be used in hospital deliveries), doctors are about as likely to use forceps, medicines to speed delivery and anaesthetics when they deliver a woman at home as they are for deliveries in hospital.

Stillbirths and Neonatal Deaths

What percentage of newborns died, by age at death? Where did the deaths occur? Did mortality vary as a function of birth weight? As a function of gestational age? As a function of prenatal care?

There were 32 pregnancies that lasted 6 months or longer that ended in a fetal death (a stillbirth): 50% of these births were male (though the sex of three of the stillbirths was reported to be unknown to the mother). Among the live births, there were 35 deaths during the neonatal period, 26 (74%) of which occurred during the first week of life. Forty-five

additional deaths occurred among infants aged 1 through 11 months, for a total of 112 stillborn/infant deaths. Males accounted for 62% of deaths in the first week, 33% of neonatal deaths after the first week, and 42% of post-neonatal deaths[8].

As seen in Table 13, among all pregnancies born alive after 6 months gestation or more, survival through infancy was the lowest among those births perceived to be large or very large. (Note: Only 6% of infants were reported to have been weighed.) Infants who were judged to be "very small" at birth were disadvantaged in the first month of life but, having survived that period, had relatively low mortality during the post-neonatal period. Among full-term babies, however, the mortality disadvantage for "very small" infants disappeared, even in the neonatal period (Table 14). Just 4% of infants who survived the first year of life, were reported by their mother to have been premature, as were 7% of those infants who died during the post-neonatal period. Among those dying in the first month of life, however, 31% were said to have been premature. Looking at the relation between gestation and mortality in detail: All twelve births occurring at an estimated gestation age of 6 months died prior to delivery or within the first week of life as did 9 (39%) of those born at seven months, 7 (23%) of those born at eight months and 31 (2%) of those born at term.

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[8] There is a potential bias in the post-neonatal data: 45% of the birth interviews were completed before the first anniversary of the birth, thus these data are right censored. Some of these children may have died after the interview was completed, but before there completed their first year of life. If these late infant deaths are in any way different from the early infant deaths on the variables we are analyzing, the results will be biased. To test for bias we have done separate analyses of subsets of the data. Though the strength of some relationships changes somewhat, the basic patterns of the relationships remains the same. Overall, therefore, we expect that the bias, if any, is small. Thus because even in the full data set the number of cases in some groups is small, we use here all the cases available.

What was the duration of illnesses experienced by those who died? What were the symptoms?

Duration of illness varied as a function of age. Among infants dying during the neonatal period, most were said either to have never been obviously ill or to have showed evidence of illness for less than one day. By contrast, among those dying during the post neonatal period, few children were never ill, or ill for only a brief time, while almost half were sick for between 4 and 29 days. (See Table 15.)

The most common presenting symptoms among the infants who ultimately died, and for whom any symptoms were observed, were diarrhea (26%), cough (15%), respiratory difficulty (7%), and fever (24%). As seen in Table 16, nearly half of all infants dying in the post-neonatal period experienced cough, fast breathing, fever, vomiting or diarrhea at some time during their terminal illness. All of these symptoms, including fast breathing, were more common among older infants than among newborns. Among the less commonly reported symptoms, some did not follow this pattern. For example, yellow eyes (e.g., icteric sclerae) were experienced by 8%, 50% and 12% of infants dying in the first week, the second through fourth weeks, and the post-neonatal period respectively. (Note the small number of cases in the 8-28 day age category.) Most (56%) of the 34 children dying during the first month of life, reported none of the listed symptoms. While this lack of symptomatology was most common during the first 4 days of life (70% of 17 children reportedly experienced no symptoms), even at days 4 through 7, 56% of 9 children reportedly experienced no symptoms. Among those dying during days 8 through 28 after birth, only 2 (25%) were reported to have had none of the listed symptoms.

A number of associated or predisposing conditions, including prolonged or complicated delivery, physical and other abnormalities, convulsions, etc., were assessed

among neonates. (See Table 17–note the small number of cases in several of the categories). All of the neonates who died within one day of birth, however, were reported to have at least one of these conditions, with most reporting a prolonged or complicated delivery. Indeed, these two conditions were the most commonly reported for all of the age groups considered, even for those dying at 7 to 28 days postpartum. However, 6 (17.6%) of the neonates who died in the neonatal period were reported to have experienced none of these neonatal specific conditions.

Although, as shown in Table 11, using medicine to speed delivery is no more common among neonatal deaths than among children who survive the neonatal period, there is a relationship between use of such medicines and the timing of death among the neonates who die. Among those who died within 24 hours of birth, 60% (of 10 deaths) of the mothers had been given medicines to speed the delivery. The level drops to about 43% (of 16 deaths) among neonates who died between 1 and 7 days after birth, and to about 37% (of 8 deaths) among those who die in the last three weeks of the neonatal period.[9]

Among all infant deaths, 75% occurred at home and only 17% in the hospital. The likelihood of dying at home increases as the age at death increases. Half of those dying within one day of birth die at home, while almost two-thirds of those dying during the first week of life do so. The likelihood of dying at home continues to increase during the last 3 weeks of the neonatal period and in the post-neonatal months. (See Table 18.)

Among the 8 neonates dying after experiencing vomiting or diarrhea, 7 (88%) experienced a dry mouth/tongue and 5 (60%) experienced sunken eyes (e.g., evidence of dehydration). Reported levels of these indicators of dehydration were lower for the 25 infants

[9] Note that this relationship is based on a small number of cases in each age group.

who died in the post-neonatal period after experiencing diarrhea--13 (52%) had a dry mouth/tongue and 11 (44%) had sunken eyes. On the other hand, none of the eight neonates who died following diarrhea were reported by their mothers to have been dehydrated, while 9 (36%) of the infants dying after an episode of diarrhea in the post-neonatal period were reported to have been dehydrated.

Some care was sought for 61% of infants prior to their death. Twenty-seven percent received care only from a private doctor, 7% only from a hospital and 20% from both. The likelihood of receiving care increased systematically with age of the infants–even for those under 1 week of age. The likelihood that older infants (1-11 months of age) would receive any treatment was significantly greater than the likelihood that neonates would do so ($p<.01$)[10]. (See Table 19.)

[10] There are some inconsistencies between the numbers of neonates dying in the first few days after birth who are reported to have died in hospital, and who are reported to have been treated in a hospital. We will consider this inconsistency in the Discussion.

Care was sought for all of the 12 infants who experienced both coughing and rapid breathing, but for just 70% of the 20 infants who had just one of these two symptoms. Likewise, care was sought for nearly all of the 13 infants with both vomiting and diarrhea (92%), but for just 75% of the 20 children with just one of these two symptoms. The presence of fever[11] was an important factor in determining whether care was sought for both respiratory difficulties (100% with fever sought care compared to 79% without) and diarrhea (91% with fever and 60% without). The number of cases in these groups is small--just 31 total cases (17 with fever, 14 without) of respiratory difficulties and 32 total cases (22 with fever, 10 without) of diarrhea. Four neonates who had cough and/or respiratory difficulty in the weeks immediately before death were described as having "crackles" (rales), five as "grunting", five as "retracting", and three as "wheezing."

Overall, 24% of the infants who died in their first year of life received antibiotics and 17% received ORS. (See Table 20.) Looking specifically at infants dying with respiratory, or diarrhea symptoms, neonates are consistently less likely to be given treatment (with the exception of oxygen for children with ARI, treated in hospitals) than are those who die during the post-neonatal period. Indeed, no neonate was given Oral Rehydration Solution (ORS) or intravenous (IV) fluids, even among the 8 whose death was associated with diarrhea, and the two of these admitted to hospital. On the other hand, 52% of those who died in the post-neonatal period were given ORS, and half of the 10 post-neonates admitted to hospital were given IV fluids. Similarly, just one (14.2%) of 7 neonates whose death was associated with

[11] The presence of fever, as in the case of all symptoms, is based on the mother's report. It is possible that this is based on what the mother was told by a doctor who examined the child (in the case of those infants who received care), but this cannot be determined from the questionnaire.

ARI was given antibiotics, while among post-neonates the use of antibiotics is much greater. On the other hand, 2 of the 3 neonates admitted to hospital with symptoms of ARI were given oxygen, while a lower percentage of post-neonates were so treated.

Discussion

Approximately three-quarters of women seek routine and "problem-based" prenatal care from private doctors and/or government health clinics. Care is sought early in pregnancy, with over 80% of those seeking care doing so in the first five months of pregnancy. On average, women who seek care make more than 3 visits, and women who go to a private physician make significantly more visits than do women who go to a GHF only. (See Table 3.) Women report experiencing a range of symptoms which might be associated with poor pregnancy outcomes, but health-seeking on the basis of these symptoms appears to be irregular, with less than one-half of women seeking care for abdominal pain, severe headaches, edema, or fever. (See Table 4.) Routine care, which means primarily tetanus vaccinations, is largely sought from the government facilities while women tend to choose the private sector when seeking care for a health problem. With the exception of bleeding and spotting and fever, the symptoms reported by the women do not seem to be related to the outcome of the pregnancy. (See Table 5.)

Diagnostic procedures are substantially and significantly less frequently performed in GHFs compared to private physicians offices. (See Table 6.) The lack of routine checkups and diagnostic procedures at GHFs has been noted in the past. Early in 1998 a new program was introduced to try to improve the care delivered at the GHFs. This program consisted primarily of health books given to physicians and all pregnant women who come into contact with the government health system, so that the consumer and doctor have guidelines of what should occur, and the woman has a record of her status and care throughout the pregnancy

and afterward. Preliminary data from a follow-on study to the work reported here suggest that these health books are having a positive impact. However, further analysis is required to confirm and measure any change. Moreover, these preliminary data suggest there are still GHFs where little, if anything, other than a vaccination is provided for women who come seeking the tetanus immunization.

Diagnostic procedures performed by private physicians did not vary systematically by birth outcome, but procedures were significantly less likely to be performed in GHFs prior to a fetal loss than to a live birth. (See Table 7.) Among women visiting a GHF, procedures were more likely to be performed if the woman was seeking care for a health problem. But even in this case, all procedures, except measuring weight and taking a blood or urine sample, were less likely to be performed by a GHF for a woman coming because of a problem than by a private physician, irrespective of the reason for visiting the private physician. (See Table 8.)

Dayas (Egyptian traditional birth attendants) are the most frequent attendants at birth and most deliveries occur in homes. (See Tables 9 and 10.) Nurses are the least likely to be either present, or responsible for deliveries. However, though most of the deliveries in which they are involved take place in the home, they are far more likely than dayas to use medicines to speed delivery and anesthetics. (See Table 11.) Complex deliveries requiring vacuum extraction and forceps are conducted in homes and both anesthesia and medications designed to accelerate delivery are commonly administered in homes and under the supervision of nurses and dayas. Doctors are the most likely to use all of these procedures, and with the exception of vacuum extraction, are as likely to use them in a delivery done in a home, as they are when the delivery is done in a hospital. Medication use is positively related to a higher level of fetal loss. (See Table 12.)

Perinatal mortality rates for the two governorates are mid-range by global standards. While death rates are somewhat lower than reported by the DHS during the previous decade, (3) the relative proportion of neonatal/post neonatal deaths are comparable. Consistent with the literature, perceived very high and, to a lesser extent, reported low birth weights are inversely associated with survival. Perceived prematurity is also a risk factor for perinatal mortality. (See Tables 13 and 14.)

Few symptoms are perceived on the neonates who die (Table 16), though most are said to result from a prolonged or complicated delivery, and many are said to exhibit abnormal breathing or crying (Table 17).

Overall, three-quarters of deaths to infants occur at home. The likelihood of dying at home increases with age. (See Table 18.) There is some inconsistency between the reported data on sources of care used during the fatal illness, and the place of death–particularly among the youngest neonates. While just one neonate who died during the first day of life is reported to have received care from a hospital, four are said to have died in hospital. Similarly among those dying at days one through three: Two are said to have received care from a hospital, but again four are said to have died in hospital. Despite these small inconsistencies, however, it is clear that the likelihood of receiving care also increases with age. (See Table 19.) Paradoxically, neonates, who are less likely than older infants to receive care (even if all inconsistent cases are assumed to have received care) are more likely to die in hospital. That is, while about 40% (adjusted for inconsistencies) of children who died during the first week of life received any treatment, 31% of them died in hospital. Among the post-neonates who died 88% received some care, and more than 35% of them received care from a

hospital, but just 10% died in hospital. While there may be cultural reasons for some of the deaths occurring at home, these data may also suggest a failure of the referral system.[12]

[12] Many families prefer that deaths take place at home. This is both considered "appropriate", and it helps to avoid bureaucratic problems. Stories of terminally ill patients being sent home to die are common. On the other hand, a study of neonatal intensive care units in two other Egyptian governorates that explicitly sought to identify such behavior, found little evidence that neonates released from the units died within a week of discharge.

Although care is sought for most infants with diarrhea and or vomiting, ORS is given to less than 40% of all infants, and to none of the neonates. (See Table 20.) Likewise, antibiotics are not routinely prescribed for infants with respiratory symptoms even though care is sought.[13]

Intervention Implications

In the Child Survival Project, and projects that both preceded and followed it, the efforts of the Ministry of Health (MOH) have focused on training MOH staff, and those in the private sector, such as dayas, who will work in cooperation with MOH health units. Interventions targeting only government facilities, however, may not have the desired impact given that women with perceived abnormalities/problems do not seek care for these issues at these locations. Interventions should address both the community (in order to change the perception that government facilities should be used only for tetanus toxoid vaccinations) and should include the private sector. At the same time, it is important to continue targeting GHFs as these are the sites from which the most vulnerable women (e.g., the poorest) will sometimes seek care. However, preliminary analysis of data from a follow-on study in the same sample, suggest that many women who lack money to pay for health care will either borrow to pay for a private physician, or endure their symptoms rather than go to a government facility. Thus, in the end, interventions must improve the quality of care delivered at GHFs and then overcome the perception that care delivered by the GHF is not good.

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[13] For each source of care used, the mother was asked: "Was [child] given or prescribed any antibiotics/ORS [depending on the illness in question] at the [source of care]?

There seem to have been many "missed opportunities" for routine screening at all health facilities, although this problem was substantially greater at government than at private facilities. Interventions should address the importance of such routine screening measures since women are presenting for care in large numbers and relatively early in the pregnancy.

The number of deliveries in uncontrolled settings (e.g., homes) in which forceps are employed, or medicines to speed delivery or anesthetics used, is of concern. Of the deliveries in which these procedures were used, in each case about half took place in the an uncontrolled setting–that is, 46 percent of the use of forceps, 54 percent of the use of medicines to speed deliveries, and 49 percent of use of anesthetics was reported to be in a home, rather than in a hospital. And doctors were as likely to use these techniques when they deliver a woman at her home as when they were practicing in a hospital (Table 12). These techniques were associated with higher rates of adverse outcomes (Table 11). The overall use of these procedures is probably too high, and their use in uncontrolled setting probably contributes to the level of adverse outcomes.

Given the apparent association of high (and very low) birth weight with high rates of early infant mortality, increased attention to obtaining weights at birth might be indicated. Infants with low or high weights might then be recommended for further evaluation and/or treatment by health professionals. Currently, weight is given little attention among newborns. Just 6% of all the newborns in our sample, and just 13% of those born in hospitals, were reported to have been weighed. Neither doctors nor parents seem to give the question of the weight of the infant much concern. The fact that three-quarters of infant deaths occurred at home (even though at some point care had been sought for the majority of these infants) suggests that medical institutions may not be playing an optimal role in the provision of health care or that parents do not understand the need for repeated visits to health care

providers if the child's condition does not improve after receiving treatment. The evidence both that parents are not recognizing symptoms of illness in young neonates and that treatments are not provided to these infants indicates the urgent need for health education interventions targeting both parents and health professionals.

Grateful Acknowledgments

Study design and data collection were supported by USAID through the Johns Hopkins Family Health and Child Survival Cooperative Agreement with USAID and through a subcontract from the Clark Atlanta Child Survival Project to the Department of International Health of the Johns Hopkins School of Public Health. Dr. M. Kassas, Head of the Child Spacing Unit of the Child Survival Project, and several members of his staff gave substantial help in the development of the questionnaires used for this study. Support for the analysis of the data was provided by MotherCare. We wish to thank Robert Black, Ken Hill, Colleen Conroy, Reginald Gipson, and Ken Gibbs for their valuable roles at various stages of this project. We wish to thank all of the field staff who worked so hard to make this project a reality and to the mothers for giving of their time. We thank Yvonne Summers for help in preparing the manuscript.

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TABLE 1

Basic Data. All Sample Women and those with a Birth Questionnaire. Minya and Qaliubia - 1995-1996

	All Women	Women with Birth Questionnaire
Mean Age	32.6	26.3
Mean Number of Years of School Completed	3.9	4.2
Percent Currently Married	93.7	99.1
Mean Parity	3.9	2.9
Mean Living Children	3.3	2.5
Mean Living Sons	1.7	1.3
Mean Children Born Alive, Now Dead	.6	.4
Percent with Per Capita Monthly Family Expenditure of Less Than 50LE	51.5	59.0
Percent Owning No Consumer Durables	30.9	38.3
N	6284	2025

TABLE 2

Pregnancies or Births and Death/Mortality Rates.
Sample Households Minya and Qaliubia - 1995-1996.

Age Group	Pregnancies/ Births	Death/ Mortality Rate	DHS-1995 Mortality Rates 1985-95
Minya			Upper Egypt
Perinatal	596	30	NA
Neonatal	589	32	47
Post-Neonatal	589	39	51
Infant	589	71	98
Qaliubia			Lower Egypt
Perinatal	380	39	NA
Neonatal	365	25	33
Post-Neonatal	365	22	28
Infant	365	49[1]	61

[1] The infant mortality rate in Qaliubia does not sum to the total of the neonatal and post-neonatal rates because there was one death for which the age at death could not be determined sufficiently accurately to attribute it to the neonatal or post-neonatal group.

TABLE 3

Percent of Women Receiving Prenatal Care by Age, Outcome of Pregnancy, Timing of First Visit and Source of Care

	SOURCE OF CARE				
AGE:	Care by GHF and Doctor	Care by Doctor Only	Care by GHF Only	No Care Sought	N
Less Than 25 Years	35.1	22.5	23.9	18.6	904
25-34 Years	33.5	25.0	18.9	22.6	916
35 Years or Older	24.2	22.5	18.9	34.4	285
TOTAL	33.1	23.4	21.1	22.4	2111

OUTCOME OF PREGNANCY:	Care by GHF and Doctor	Care by Doctor Only	Care by GHF Only	No Care Sought	N
Fetal Loss - 5 Months or Less	6.6	43.6	6.1	43.6	181
Fetal Loss - 6-8 Months	47.1	17.6	23.5	11.8	17
Fetal Loss - 9 Months	47.1	23.5	0.0	29.4	17
Fetal Loss - TOTAL - 6-9 Months	47.1	20.6	11.8	20.6	34
Neonatal Death - 6-8 Months	41.7	33.3	8.3	16.7	12
Neonatal Death - 9 Months	34.8	8.7	17.4	39.1	23
Neonatal Death - TOTAL - 6-9 Months	37.1	17.1	14.3	31.4	35
Survivor[1] - 6-8 Months	33.3	27.8	27.8	11.1	36
Survivor - 9 Months	35.4	21.4	22.8	20.4	1825
Survivor - TOTAL - 6-9 Months	35.4	21.5	22.9	20.2	1861

TIME OF FIRST VISIT:[2]	Care by GHF and Doctor	Care by Doctor Only	Care by GHF Only	TOTAL
Third Month or Before	58.2	57.3	28.0	49.4
Fourth or Fifth Month	28.0	17.9	47.8	31.0
Sixth Month or Later	12.7	21.2	23.8	18.0
DK	1.1	3.6	.5	1.5
MEAN NUMBER OF VISITS	3.6	4.5	2.4	3.6
N	661	363	404	1428

[1] Survivors are births that survive at least the first month of life. Some of these children were, in fact, dead at the time of interview, but they had died at an age of greater than 28 days.

[2] Based on Pregnancies Lasting 9 Months.

TABLE 4

Percent of Women having Specific Problems in the Last Month of Pregnancy and Source of Care by Health Problem

Problem	Total With Problem[1]	SOURCE OF CARE: Care by GHF and Doctor	Care by GHF Only	Care by Doctor Only	No Care Sought	N
Abdominal Pain	33.7	.7	8.2	37.0	54.1	697
Severe Headache	30.3	.8	8.0	36.4	54.8	624
Swelling	25.4	.6	7.5	34.6	57.3	517
Fever	15.5	.3	8.6	44.3	46.8	325
Bleeding	6.8	2.1	14.1	59.9	23.9	142
Spotting[2]	4.1	0.0	15.2	31.8	53.0	66
N	2110					

[1] The total of the percentages is greater than 100.0, because some women suffer from more than one problem in the last month of pregnancy.

[2] The question on spotting was asked only of those women who did NOT report bleeding.

TABLE 5

Percent of Women Having Specific Problems in the Last Month of Pregnancy by Outcome of Pregnancy

OUTCOME OF PREGNANCY:	Abdominal Pain	Severe Headache	Swel-ling	Bleed Fever	Spot-ing	ting[1]	N
Fetal Loss - 5 Months or Less	42.8	35.6	3.4	24.0	59.8	9.9	174
Fetal Loss - 6-8 Months	50.0	18.8	12.5	37.5	18.8	23.1	16
Fetal Loss - 9 Months	31.3	37.5	18.8	0.0	0.0	0.0	15
Fetal Loss - TOTAL - 6-9 Months	40.6	28.1	15.6	18.8	9.7	10.3	31
Neonatal Death - 6-8 Months	41.7	33.3	33.3	33.3	33.3	0.0	12
Neonatal Death - 9 Months	13.0	21.7	21.7	4.3	4.3	0.0	23
Neonatal Death - TOTAL - 6-9 Months	22.9	25.7	25.7	14.3	14.3	0.0	30
Survivor[2] - 6-8 Months	38.9	44.4	36.1	13.9	11.1	0.0	36
Survivor - 9 Months	32.9	29.5	27.6	14.6	1.5	3.9	1822
Survivor - TOTAL - 6-9 Months	33.0	29.8	27.7	14.6	1.7	3.8	1858
Total	33.8	30.2	25.5	15.5	6.9	4.1	2098

[1] The question on spotting was asked only of those women who did NOT report bleeding.

[2] Survivors are births that survive at least the first month of life. Some of these children were, in fact, dead at the time of interview, but they had died at an age of greater than 28 days.

TABLE 6

Percent of Women Ever Receiving Listed Antenatal Services From the Specified Source of Care by Source of Health Care (GHF or Private Physician)

Procedure	GHF	Private Physician
Blood Pressure	23.9	83.4
Weight	14.6	17.5
Palpate abdomen	16.9	82.2
Check legs	6.7	32.8
Check fetal heart	8.0	53.3
Blood sample	9.1	10.5
Urine sample	10.3	15.5
Breast Feeding Education	5.6	18.0
Tetanus Toxoid	85.4	15.2
N	1151	1201

TABLE 7

Percent of Women[1] Ever Receiving Listed Antenatal Services From the Specified Source of Care by Birth Outcome and Source of Care (GHF or Private Physician)

	GHF			Private Physician		
Procedure	Fetal Loss	Neonatal Death	Survivor	Fetal Loss	Neonatal Death	Survivor
Blood pressure	10.0	38.9	23.6	82.6	89.5	84.2
Weight	0.0	23.5	14.9	13.0	21.1	18.0
Palpate abdomen	5.0	33.3	16.5	52.2	73.7	84.2
Check legs	0.0	11.8	6.9	26.1	21.1	34.3
Check fetal heart	5.0	16.7	8.0	60.9	31.6	55.7
Blood sample	0.0	16.7	9.1	4.3	10.5	11.0
Urine sample	0.0	11.1	10.0	4.3	15.8	15.4
Breastfeeding Educ	0.0	5.6	6.1	13.0	26.3	19.0
Tetanus Toxoid	80.0	83.3	86.9	8.7	15.8	16.3
N	20	18	1085	23	19	1061

[1] This table includes women with pregnancies lasting 6 to 9 months only.

TABLE 8

Percent of Women with Surviving Births[1] Ever Receiving Listed Antenatal Services From the Specified Source of Care by Source of Care (GHF or Private Physician) and Reason for Attending Specified Source

	GHF		Private Physician	
Procedure	Problem	Routine Visit	Problem	Routine Visit
Blood pressure	57.6	14.5	84.9	81.8
Weight	23.2	12.7	15.7	26.7
Palpate abdomen	47.2	8.3	86.0	77.2
Check legs	21.4	3.1	34.4	34.8
Check fetal heart	24.1	3.6	56.1	54.0
Blood sample	15.3	7.5	10.1	14.2
Urine sample	20.1	7.4	13.0	24.4
Breastfeeding Educ	15.7	3.5	18.7	20.0
Tetanus Toxoid	55.5	95.3	15.1	20.5
N	229	856	833	225

[1] This table includes women with pregnancies lasting 6 to 9 months, and for which the birth survived the first month of life only.

TABLE 9
Attendance at Birth and Outcome of Pregnancy by Type of Attendant - Among Pregnancies of 6 Months Gestation or More

Attendant	Present[1]	Respon-sible[2]	Fetal Loss	Neonatal Death	Survivor	N[3]
Daya	62.6	52.0	.7	1.7	97.6	1204
Doctor	32.3	29.8	3.9	2.4	93.7	620
Nurse	18.1	11.7	2.3	1.4	96.2	346
N	1939	1939				

[1] Percents total greater than 100% since there may have been more than one type of attendant present at the birth.

[2] Percents total LESS than 100% because in a few cases (about 5% of all deliveries) someone else (mother-in-law, other female relative, no one) was in charge of the birth.

[3] It is not correct to sum these Ns to estimate the total number of babies born. Because more than one attendant was present at some births, the total of this column is greater than the total number of births.

TABLE 10
Place of Birth - Among Pregnancies of 6 Months Gestation or More

Place	
Mother's Home	63.3
Other Home	10.1
Health Center	.4
Government Hospital or Clinic	14.2
Private Hospital or Clinic	11.4
Other	.7
N	1938

TABLE 11

Characteristics of Deliveries by Type of Attendant and Outcome of Pregnancy - Among Pregnancies of 6 Months Gestation or More

	Health Worker Responsible			Outcome			
	Daya	Nurse	Doctor	Fetal Loss	Neonatal Death	Survivor	Total
Used Forceps	2.4	4.9	13.1	6.9	3.1	5.5	5.5
Used Vacuum Extraction	.6	.4	14.7	3.4	0.0	4.6	4.5
Used Medicine to Speed Delivery	21.0	68.3	82.3	62.5	45.7	45.3	45.5
Used Anesthetic	13.3	56.3	68.0	50.0	52.9	35.2	35.7
Cord Cut with: Razor	38.9	26.8	1.7	3.1	25.7	28.0	27.5
Scissors	34.5	43.3	27.4	6.3	25.7	32.9	32.3
Other	3.7	5.4	6.8	37.5	5.7	4.4	5.0
DK	22.8	24.6	64.0	53.1	42.9	34.7	35.2
N	994	224	568	32	35	1858	1925

TABLE 12

Characteristics of Deliveries by Place of Delivery, for All Deliveries, and Separately for Deliveries for Which a Doctor was Responsible - Among Pregnancies of 6 Months Gestation or More

	Place of Delivery		Percent of Procedure at Home	Doctor Responsible	
	Home	Hospital	Home	Home	Hospital
Used Forceps	3.3	12.9	46.5	12.2	13.4
Used Vacuum Extractor	1.0	16.0	16.9	7.1	16.5
Used Medicine to Speed Delivery	33.2	81.8	53.7	83.8	82.4
Used Anesthetic	23.8	69.2	49.5	60.6	69.1
N	1420	426		99	463

TABLE 13

Perceived Size of Newborn and Outcome of Pregnancy by Perceived Size of Newborn - Among Pregnancies of 6 Months Gestation or More

Perceived Size	All Live Births	Neonatal Deaths	Infant Deaths	Infant Survivor	N
Very small	9.7	3.3	.5	96.2	184
Small	16.0	1.7	3.0	95.3	300
Average	65.8	1.6	2.2	96.2	1247
Large	7.5	2.1	4.2	93.7	142
Very Large	.7	7.1	14.3	78.6	14
Don't Know	.2				
N	1903				

TABLE 14

Perceived Size of Newborn and Outcome of Pregnancy by Perceived Size of Newborn - Among Pregnancies of 9 Months

Perceived Size	All Live Births	Neonatal Deaths	Infant Deaths	Infant Survivor	N
Very small	9.2	.6	.6	98.8	170
Small	15.6	1.0	2.8	96.2	286
Average	66.6	1.2	2.2	96.6	1231
Large	7.5	2.1	3.6	94.3	140
Very Large	.8	7.1	14.3	78.6	14
Don't Know	.2				
N	1903				

TABLE 15

Duration of the Terminal Illness, by Age at Death

	Age at Death		
Duration	<= 7 Days	8-28 Days	1 - 11 Months
Never Ill/Less Than 1 Day	66.7	25.0	11.9
1-3 Days	8.3	25.0	14.3
4-29 Days	0.0	25.0	47.6
30 Days or More	0.0	0.0	7.1
Since Birth	25.0	25.0	19.0
N	24	8	42

TABLE 16

Perceived Symptoms at Any Time During the Terminal Illness, by Age at Death

	Age at Death		
SYMPTOM	<= 7 Days	8-28 Days	1-11 Months
Cough	7.7	25.0	45.0
Fast breathing	15.4	25.0	40.0
Fever	7.7	37.5	70.0
Chills	7.7	12.5	12.5
Yellow eyes	7.7	50.0	12.5
Red urine	3.8	0.0	12.5
Diarrhea	7.7	14.3	47.5
Vomiting	15.4	25.0	47.5
NO Symptom Reported	65.4	25.0	2.5
N	26	8	40

TABLE 17

Perceived Neonatal Specific Symptoms at Any Time During the Terminal Illness and Use of Medicine to Speed Delivery, by Age at Death

	Age at Death					
SYMPTOM	0 Days	1-3 Days	4-7 Days	<=7 Days	8-28 Days	Total
Prolonged Delivery	40.0	42.9	33.3	38.5	50.0	41.2
Complicated Delivery	50.0	42.9	33.3	42.3	37.5	41.2
Bruises/Injury	0.0	0.0	0.0	0.0	0.0	0.0
Abnormalities	10.0	14.3	11.1	11.5	12.5	11.8
Abnormal Breathing	30.0	28.6	11.1	23.1	12.5	20.6
Abnormal Crying	40.0	14.3	22.2	26.9	12.5	23.5
Convulsions	0.0	0.0	11.1	3.8	25.0	8.8
Limp/Unconscious	10.0	0.0	33.3	15.4	12.5	14.7
NO Symptom Reported	0.0	42.9	22.2	19.2	12.5	17.6
Used Medicine to Speed Delivery	60.0	42.9	44.4	50.0	37.5	47.1
N	10	7	9	26	8	34

TABLE 18

Place of Death, by Age at Death

	Age at Death						
Place of Death	0 Days	1-3 Days	4-7 Days	<=7 Days	8-28 Days	1-11 Mo.	Total
Home	50.0	57.1	88.9	65.4	75.0	81.0	75.0
Hospital	40.0	42.9	11.1	30.8	12.5	9.5	17.1
Other	10.0	0.0	0.0	3.8	12.5	9.5	7.9
N	10	7	9	26	8	42	76

TABLE 19

Treatment for the Terminal Illness, by Age at Death

	Age at Death						
TREATMENT	0 Days	1-3 Days	4-7 Days	<=7 Days	8-28 Days	1-11 Mo.	Total
Any Treatment	10.0	28.6	33.3	23.1	50.0	87.8	61.3
Private Doctor Only	0.0	0.0	11.1	3.8	37.5	36.6	26.7
Hospital Only	10.0	28.6	0.0	11.5	0.0	4.9	6.7
Government Health Clinic Only		0.0	0.0	0.0	0.0	0.0	2.4
1.3							
Private Doctor and Hospital	0.0	0.0	22.2	7.7	0.0	31.7	20.0
N	10	7	9	26	8	41	75

TABLE 20

Treatment of Terminal Illness, and of Terminal ARI and Diarrhea, by Age at Death
Age at Death

TREATMENT	<=28 Days	1-11 Months	Total
All Deaths			
Antibiotic	2.9	41.5	24.0
ORS	0.0	31.7	17.3
N	34	41	75
ARI Associated Deaths			
Antibiotic	14.2	52.0	43.8
N	7	25	32
Hospital Antibiotic	0.0	25.0	20.0
Hospital Oxygen	66.6	36.4	42.9
N	3	12	15
Diarrhea Associated Deaths			
ORS	0.0	52.0	39.4
N	8	25	33
Hospital ORS	0.0	20.0	16.7
Hospital IV Fluids	0.0	50.0	41.7
N	2	10	12

The Role of Traditional Birth Attendants in Pre- Intra- and Post-Natal Care in Egypt:

Implications for Training and Program Implementation

Short Title: The Role of Traditional Birth Attendants in Egypt.

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ACKNOWLEDGMENTS

Study design and data collection were supported by USAID through the Johns Hopkins Family Health and Child Survival Cooperative Agreement with USAID and through a subcontract from the Clark Atlanta Child Survival Project to the Department of International Health of the Johns Hopkins School of Public Health. Dr. M. Kassas, Head of the Child Spacing Unit of the Child Survival Project, and several members of his staff gave substantial help in the development of the questionnaires used for this study. Partial support for the analysis of the data was provided by UNICEF Egypt National Office, and MotherCare. Thanks to Robert Black, Kenneth Hill, and Reginald Gipson, for their valuable contributions at various stages of this project, to all of the field staff who worked so hard to make this project a reality, and especially to the mothers and dayas for giving of their time.

ABSTRACT

Two-thousand, twenty-five women who were pregnant during a two year period from mid-1994 though mid- to late-1996 were interviewed about a total of 2128 pregnancy outcomes, after giving birth. This paper will use these data to examine the role of Egyptian traditional birth attendants (dayas) during the pre-, intra-, and post-natal period, and assess the impact of the training some of them received from the Egypt Child Survival Project (ECSP).

Dayas play little role in prenatal care. Their primary function is to serve as birth attendants, though they also customarily visit women in the first week after birth. In general, trained dayas have better behaviors in many of the areas the training deals with. However, the training also seems to have brought unwanted side-effects in the form of use of tools and drugs appropriate for complicated deliveries, but used in an uncontrolled environment, in the home of the woman. Improvements in daya knowledge and care have been made–but there is still much work to be done.

Key Words: Egypt, Traditional Birth Attendant, Training.

The Role of Traditional Birth Attendants in Pre- Intra- and Post-Natal Care in Egypt: Implications for Training and Program Implementation

INTRODUCTION

In many developing nations traditional birth attendants (TBAs) continue to play a major role in childbirth. In Egypt, for example, TBAs deliver almost half of all births (El-Zanaty, et al. 1995). Egypt is said to be "one of the first countries to train" TBAs (Piper 1997) with a program during the 1960s. But training lapsed, and for some time, the practice of TBAs was illegal. Though their legal standing was restored in 1982, (Piper 1997) the structures for training and monitoring TBAs remained weak, and it is believed that some of their practices contributed to higher than necessary maternal and perinatal/neonatal morbidity and mortality. Assuming that TBAs will continue to play an important role in maternal care for some time to come, in recent years efforts have been made to improve the quality of services they deliver. Improved care, it is believed, could have a substantial impact on the health of mothers, and could greatly reduce the risk of death for pregnant women and their newborn children.

From 1990 through 1996, the Egypt Child Survival Project (ECSP), implemented a large scale program throughout Egypt to train traditional birth attendants (dayas). Materials were developed, and groups of dayas were brought together for 7 to 10 days of training. The trained dayas were given credentials to document their training and distinctive bags in which to carry their delivery kits. They were assigned to report to a nurse at their local health center, so that pregnant women and their newborns can be properly registered and followed by the government health system.

As their title implies, the primary role of traditional birth attendants is to assist women at the time of delivery[1]. Logically, therefore, the primary focus of the training was on safe delivery, including early recognition of complications, avoidance of infection, and proper care of the newborn. However, it has also been noted that dayas tend to live in the communities they serve; are similar in background and thought to the women they serve; and are generally available, whether in their homes, on the street, or in the market, to the pregnant and post-partum women they serve. It has been suggested, therefore, that in some societies there is a "cultural identification of the woman with the TBA" (Castaneda Camey et al., 1996; see also: Eades, et al 1993; Itina 1997; and Lefeber and Voorhoever 1997). In keeping with this line of thinking, the training program in Egypt included aspects of pre- and post-natal care. Dayas were trained to contact, support and advise pregnant women--and specifically to visit them in their homes and escort them to the local government clinic for tetanus immunization and a prenatal examination. In the postnatal period, the focus of the training was on messages the dayas could convey to the mother about nutrition, cleanliness, and other basic health behaviors. The daya was also expected to again escort the mother and her newborn to the government clinic for vaccinations and weighing the child. In addition, dayas were taught to do a simple postnatal examination of the women that could reveal problems that would require a doctor visit.

In this paper I will examine whether the dayas were fulfilling the tasks for which they had been trained. I will use data collected from over 2000 women living in a representative

[1] While some argue that "TBAs" should/do have a wider role to play in prenatal and postnatal care, and should therefore be referred to as "traditional midwives", in Egypt the term TBA (daya) fits very well the actual role of the women described in this paper.

sample of 6000 households in two Egyptian governorates (provinces) who had a pregnancy outcome during a two year period from late-1994 through late-1996, and from a small sample of dayas who assisted some of these women during their pregnancies and birth. This will allow us to assess the assumptions on which the training is based and to suggest ways in which the training of dayas can be improved. This exercise can also help in making the expectations for dayas more realistic.

THE ROLE OF THE DAYA IN EGYPTIAN SOCIETY

The daya, in Egypt, is fundamentally a traditional birth attendant. That is, she is called when the contractions begin, and takes responsibility for the delivery of the child. Typically, in the past, she performed few, if any, prenatal functions; and though it has always been the tradition of dayas to visit the mother and newborn in the period immediately following birth, these visits were largely ceremonial.

Previously available data on the role of the daya support this stereotypical perspective. Table 1 shows Demographic and Health Survey (DHS) data for "Assistance during Delivery" by region of the country. A daya attended almost half of all deliveries in Egypt as a whole. In areas such as rural Upper Egypt, dayas were responsible in almost 70 percent of all births (El-Zanaty et al. 1995, Table 10.8, reproduced here as Table 1). This same DHS, however, found that almost no women went to dayas for "antenatal care" (El-Zanaty et al. 1995, Table 10.2), and it includes no information at all on post-natal care--whether by dayas or by anyone else.

INSERT TABLE 1 ABOUT HERE.

As noted above, however, the Egyptian daya training program sought to involve dayas in all phases of maternal and neonatal care. That is, the training was effectively divided into three segments: 1) pre-; 2) intra-; and 3) post-natal care. Before designing the training program there were no data available documenting the dayas' actual role in Egyptian society. Here I will analyze more detailed data than are available in the DHS, or elsewhere, in order to demonstrate what health care and support the women of two Egyptian governorates actually use when they are pregnant, during delivery, and in the immediate postnatal period– focusing specifically on the role of the daya. These data also have some information on how dayas are perceived, and will be supplemented by data from interviews with dayas, themselves.

THE DATA

Between 1995 and 1997 the Social Research Center of the American University in Cairo conducted a study in a multi-stage, representative, clustered, systematic random sample of 3000 households, in each of two governorates of Egypt to assess the achievements of the ECSP. The two governorates included in the research are Minya and Qaliubia. These two governorates were selected arbitrarily by the Ministry of Health to represent "traditional-Upper" and "modern-Lower" Egypt, respectively. Minya, 250 kilometers south of Cairo is a relatively poor, traditional area. Fertility and mortality remain relatively high, while education is low--particularly among females. Qaliubia, on the other hand, is immediately to

the north of Cairo, in the Nile delta. Fertility and mortality are quite low, educational levels are about as high as anywhere in Egypt, and are very similar for males and females. The northernmost, periurban suburbs of Cairo are located in this governorate, and they are heavily industrialized. Because of these substantial and important differences in the two governorates, as well as because the samples were chosen to be representative of each governorate, I will, when examining data from women with a pregnancy outcome, present results separately for Minya and Qaliubia. In many cases comparison of the results for the two governorates is, in itself, informative.

Data collection began with a baseline survey in late 1995. This was followed by four subsequent rounds of data collection spaced at intervals of about 3 months, for a total follow-up period of 1 year. The focus of the study was on child health, but it also included interviews with more than 2000 women who had a pregnancy outcome (whether a fetal death or a live birth) during the prospective follow-up year, or in the year before the baseline survey.

The baseline data collection included a pregnancy history for all ever-married women under 55 years of age. All pregnancies the woman had experienced, regardless of their duration or outcome, were reported. For all currently married women, the current pregnancy status was recorded. Pregnancy outcomes in the year before the baseline survey were identified from the pregnancy history. During the prospective year, at each round, all currently married women were asked, by an interviewer, if they were currently pregnant, and, if not, if they had had a pregnancy that ended since the previous visit. These current status data were checked carefully both by the interviewers, and later, by computer, for any pregnancies for which no outcome was reported. Thus, particularly during the prospective

year, it is likely that almost all pregnancies, except those that lasted only very short periods were recorded.

All women with a pregnancy outcome in the year before the baseline survey, or during the prospective year, were interviewed using a detailed "birth" questionnaire. This questionnaire asked about sources of prenatal care, and the reasons for seeking such care; about who was present at, and responsible for, the delivery; about details of the delivery; and about post-natal health contacts and problems. While dayas were a focus of this work, the questionnaire also included specific questions about all other care providers, and dayas were not specifically emphasized in the questionnaire. In addition, a small number of dayas (51) who had assisted during the pregnancies, or at the time of delivery of sample women were interviewed using a structured questionnaire. The interviewed dayas were selected because they had been identified as having assisted five or more of the women in the birth sample. The daya questionnaire included some basic background information including training status, and a wide range of questions about their stated practices in dealing with pregnant women and newborns, plus knowledge of maternal and child health issues. (A brief profile of the dayas interviewed is in Appendix A.) These quantitative data have been supplemented with a small number of qualitative interviews with selected women who used a daya to

deliver their recent birth, focusing on specific issues, including the role of dayas. In this paper I will describe the role of dayas as reflected in these quantitative and qualitative data, and discuss the implications for daya training and program implementation.

THE ROLE OF THE DAYA

Prenatal Care

As noted above, the daya is generally not seen as having a role in prenatal care. This is consistent with some a number of other reports (Barnes-Josiah, et al. 1998; Berggren, et al. 1983; Itina 1997; Jeffery, Jeffery, and Lyon 1989; Stephens 1992; Wollast, et al. 1993), though sometimes there are different views even for a single country. For example, in Bangladesh, TBAs are trained to "conduct antenatal exams regularly" (Nessa 1995), but a study in Bangladeshi villages finds that when TBAs "are involved in a birth, they are called in only after the woman's labor pains have already begun" (Rozario 1995). However, a report on Ghana claims that "all [TBAs] reported attending the pregnant woman in the months before delivery" (Eades, et al. 1993) and a report on use of TBAs in Mexico found that 60 percent of women visit the TBA at least once during pregnancy (Castaneda Camey, et al. 1996). In Egypt, not all those involved in care of pregnant women accept the view that dayas rarely perform prenatal care. During the preparation for this work a number of the people involved in the daya training program in the ECSP clearly indicated they believed dayas do play a meaningful role in providing guidance and advice to pregnant women. And a recent report on a number of focus groups consisting of new mothers, and examining the role of dayas suggested that many women consult the daya during pregnancy because the daya can

determine if the woman is pregnant and give her advice on taking care of the pregnancy (Fateem, 1995).

Moreover, even some who acknowledged that traditionally dayas have had little, or no, role in antenatal care agreed that the daya training should include a component covering this period, in the hope that perhaps dayas could be induced to provide education and support to pregnant women in the community. Much, if not all, of this thinking seems to be rooted in the idea that village women share a common culture with the TBA, and therefore these women will find the TBA a trusted source of information and help. Whatever the reasons, it was decided to include prenatal care as one unit of the daya training.

The prenatal care unit of the training is very basic. The main responsibility of the daya is to advise pregnant women to go to a government health facility (GHF) for antenatal care. Indeed, the dayas are urged to visit the woman in her home and to escort her to a GHF so as to ensure that the woman is registered and that a prenatal examination is done and any necessary care delivered. However, the daya is also trained to recognize certain symptoms (severe headache, severe vomiting, severe oedema, vaginal bleeding) that may indicate a more serious problem for which the woman may need immediate care. They are taught what types of examinations, tests, and care the woman should expect to get at a GHF. They are also taught information about proper diet, cleanliness, and other health behaviors the mother should follow during her pregnancy to ensure as safe and healthy a pregnancy and birth as possible.

While the subject matter in which the dayas are trained no doubt is very reasonable, the value of the training is compromised by two fundamental obstacles. The most basic of these is that, in fact, few women consult a daya during their pregnancy. As noted above, the 1995 Egypt DHS reported that almost no women received antenatal care from TBAs. In part,

this is an artifact of the way DHS approaches the question of antenatal care[2]. The birth questionnaire, on the other hand, asked a broader question of whether, during the course of her pregnancy, the woman had received any visit at home from a daya. Just 4 percent of women report such visits from the daya[3] (Table 2).

INSERT TABLE 2 ABOUT HERE.

The low level of daya involvement in prenatal care, in our sample of women, was first noticed during preliminary analysis of an early subset of the data. In the context of the briefings received from those who ran the daya training program, this very low level of involvement was unexpected. Discussions with a number of Ministry of Health officials, and others, involved in daya training revealed differences of opinion as to whether this finding was reasonable. Some felt that dayas are an important source of prenatal care, or support, for women, while others felt the lack of prenatal contacts with dayas should be expected. To

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[2] Antenatal care according to the DHS requires that the woman actually receive an examination or medical test. A woman who goes to a clinic but gets only a tetanus immunization would not be considered to have received antenatal care. If a daya followed her training and escorted a pregnant woman to a GHF for a vaccination, she would not be considered to have delivered antenatal care. In general, it would be unusual for a daya to deliver services that would be classified as antenatal care by the DHS.

[3] In more recent research an even broader question, asking about any contact or discussion with the daya during pregnancy was used. Even this variation of the question found very little prenatal contact with dayas.

examine this question more closely, a small group of the women from our sample in Minya Governorate who had used a daya during delivery, and who were a part of ongoing semistructured interviews were asked several open questions about prenatal care and delivery, including when, if at all, a daya should be consulted.

The comments of these women were striking. Most felt the daya should be called only when it was time for delivery, after the waters broke and the contractions became sharp. At that time, when delivery was imminent someone would be sent to bring the daya to attend the delivery. The general feeling expressed by the women was that there is no need to consult a daya during pregnancy, because the daya knows nothing about prenatal care. The daya's role is clearly seen by these women to be limited specifically to delivery. Equally there are no indications in the statements by the women interviewed using these semistructured questions of a cultural identity with, or trust in the daya and her knowledge. (See the comments of a number of women from Minya Governorate in the side box.)

> I have delivered 10 times and I have gotten used to it. ... I am used to when the pain comes that I send for the daya, and she is the one that delivers ....
>
> There is nothing to talk about.
>
> Because I am going to the doctor. The daya may not know what I have, and she doesn't know to write a prescription.
>
> If I talk with the daya she will tell me to go to the doctor because she [the daya] knows only how to deliver.

Data from interviews with the dayas themselves show that many of them agree with this point of view: A substantial proportion of them concede that they need not be consulted during pregnancy, but should be called only when contractions begin or when the delivery is perceived to be imminent. For example, when the 51 dayas for whom data are available, were asked when, in what month, pregnant women who the daya delivers usually first contact

her, just 39.3 percent gave an answer in months--5.9 percent said before the third month, 21.6 percent in the third month, and 11.8 percent after the third month. The remaining 60.7 gave answers that did not respond directly to the question, but gave some other condition guiding when the women usually come: 39.2 percent said either "just before delivery" or "not at all, except at the hour of delivery", while an additional 15.7 percent said "when the woman is sick". The remaining 5.9 percent (3 dayas) gave other answers, or didn't know.[4] When asked when women should first come to see them, the answers follow a very similar pattern.

Dayas who answered the question of when women should come to see them with a month, were next asked how many visits the woman should make. Of this subsample of 27 dayas, 40.7 percent said the woman should come when she was sick. Thus, even among dayas themselves, only about 25 percent of the total sample of 51 believe that women should come to them before the time of delivery, and see them at some time other than when the woman is sick.

In sum, pregnant women and dayas seem to agree that the daya's role in prenatal care is limited.

[4] The responses were very similar in Minya and Qaliubia. Because the number of dayas interviewed in Qaliubia is very small (12), however, we have not presented the results separately by governorate.

There is a secondary obstacle to having dayas play a useful role in prenatal care, at least given the type of role they have been trained to fulfill. This obstacle is mentioned primarily because it points to another, ultimately more serious, problem in prenatal care. Specifically, even if dayas did take women to a local GHF, the care they would be likely to get there would in many cases be seriously deficient[5]. Briefly, in the two governorates studied, about 53-55 percent of women went to a GHF during their pregnancy. Of these, over 50 percent received ONLY a tetanus vaccination, and no other examination, tests, or information. Most women who seek either routine prenatal care (other than a tetanus immunization), or curative care for a specific pregnancy related problem, go to a private physician, rather than to a GHF.

Table 3 shows, by governorate, the percentage of women who went to each type of health service by the reason they went to that service, and then, within each reason/service group, the type of service that the women actually received. These data show clearly that when women visit a GHF, they do so primarily for a routine visit, while doctor visits are usually for health problems. Among women who go to either a doctor or a government clinic for routine care, however, a very high proportion (79% in Minya and 69% in Qaliubia) of those going to a GHF get only a tetanus vaccination, while among those going to a private doctor, the vast majority get other care only, and none get only a tetanus immunization. (See also: Stanton and Langsten 1999.)

INSERT TABLE 3 ABOUT HERE.

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[5] According to new data collected as part of a follow-up study to this work, the quality of care received by those going to a GHF during pregnancy may be improving. The improvement seems to be driven by new health books given to pregnant women on their first visit to a GHF during pregnancy. This health book lists the components of a thorough prenatal examination, and therefore doctors have a guide telling them what they should be doing for pregnant women. At least some doctors, in some GHFs, seem to be making good use of this guide. We will be examining this issue further in the future.

The failure of GHFs to provide a range of antenatal care to pregnant women who come for a tetanus immunization is clearly a missed opportunity for the provision of proper prenatal care. While the situation may be improving, we know that many opportunities are still missed. Thus, even if the daya fulfilled her responsibility of taking the woman to a GHF, a large proportion of the women would still not receive proper prenatal care.

Intranatal Care

The primary role of the traditional birth attendant, is, as it has always been, to assist women at the time of delivery. The results of the 1995 DHS for Egypt as a whole are shown in Table 1 above. Our results for Minya and Qaliubia are presented in Table 4. Despite using somewhat different categories, these results are quite similar to the DHS results for comparable regions. That is, we compare the Minya data with DHS Upper Egypt data, and the Qaliubia results with those from DHS Lower Egypt.

INSERT TABLE 4 ABOUT HERE.

The pattern of attendance at birth is significantly different in Minya than in Qaliubia, with more women in Qaliubia (50% as opposed to 23% in Minya) having a doctor deliver their child, while in Minya the majority of women still have only a daya attend them (63% against 40% in Qaliubia). This difference almost certainly reflects the greater level of development in Qaliubia, and suggests the tendency of more women to use professional sources of care for delivery as access to formal health services expands, and as education and other social indicators improve. Still, even in Qaliubia, a substantial proportion of women deliver at home, with a daya responsible for the birth. Thus, for the foreseeable future,

improving the quality of services that dayas deliver could have a substantial positive impact on the health of both mothers and their newborns.

The daya training of the ECSP had two main foci: 1) to improve the cleanliness of the daya, of the delivery area, and of the tools she used; 2) to give the daya sufficient knowledge of birth complications that she could recognize a potentially dangerous situation and refer the woman to a GHF or other facility capable of dealing with a complicated delivery. In this section, I will assess whether the training dayas received has led to better delivery practices.

It is not possible to measure the impact of the training directly by examining the knowledge and behavior of specific dayas before and after training. But it is possible to compare reported behavior by dayas said to be trained with that of those dayas who are said not to have been trained. In addition, we have data from the dayas themselves on what they say their behavior is. In these data also, we have information on the training status on the dayas.

In the questionnaire for women who gave birth, three questions were used as indicators of the daya's training status: 1) did the woman think the daya was trained; 2) did the daya have a certificate; 3) did the daya have a case of the type given to those who complete the training course? Various combinations of these variables were examined. In the end it was decided that any daya who was thought to have been trained OR to have a certificate would be considered to have been trained. Using this criterion, trained dayas generally have better behaviors than those who are not trained. There remain, however, some areas of concern (Table 5).

INSERT TABLE 5 ABOUT HERE.

While the training seems to have had little impact on some items such as changing shoes when the daya arrives for delivery (in Minya trained dayas are significantly *less* likely

to change their shoes than the untrained dayas, though the difference is small), in a number of other areas trained dayas are significantly more likely to exhibit the behaviors they were to have learned as a part of the training. They are more likely to change their clothes when they arrive for the delivery, more likely to use scissors to cut the cord, and more likely to sterilize the scissors with boiling water. These are small issues, but important in reducing the risk of infection and of tetanus.

The questionnaire administered to dayas used two questions to assess their training status: 1) a direct question of whether the daya had been trained, and, among those who said they had been trained; 2) a question on whether the daya had a **carnet** (a certificate) to verify her training. Of the 51 dayas for whom we have data, 84 percent claim to be trained, but just over half of these (54 percent) claim to have a **carnet**. (Among those claiming to have a **carnet**, only 64 percent could actually produce the **carnet** at the time of the interview. However, we accepted the statement that the daya had a **carnet** as sufficient to verify her training.)

The interviewed dayas were asked two questions about cutting the cord: 1) what instrument they used to cut the cord; and 2) how that instrument was sterilized. The question was asked in an open fashion. For example, the daya was asked: "What do you usually use to cut the cord?" No answers were read or suggested. The daya was free to mention whatever she thought appropriate, and more than one answer was allowed. In the case of the two questions here considered, the dayas were trained to cut the cord with scissors and to sterilize the scissors by boiling it in water. While giving an answer does not imply that the daya actually follows the stated behavior, it does indicate whether or not she knows the correct answer.

In the case of the instrument used to cut the cord, scissors was the most frequently mentioned, and was generally the only instrument mentioned (Table 6). Trained dayas were somewhat more likely to mention it than untrained dayas, and dayas with a **carnet** more likely than dayas without a carnet. The responses to the question of how the instrument used was sterilized were less adequate. Although the great majority of dayas mentioned boiling, most also mentioned an alternative (almost always the use of alcohol). Still, dayas with training and those having a **carnet** were slightly better than dayas without.

INSERT TABLE 6 ABOUT HERE.

One area of particular concern, however, is the use of medicines to speed delivery. This is a very common practice in Egypt. Among the women in our sample who delivered in hospital more than 80 percent were given something to enhance the contractions and "help" the delivery (Stanton and Langsten 1999). While this is almost certainly an overuse of such medications, in a hospital setting, at least in theory, the mother and fetus can be properly monitored. In the case of home deliveries, and especially when the daya is responsible, this is not possible. There is nothing in the daya training that deals with such medications one way or the other. Certainly, no responsible training course would in any way suggest that dayas could, under any circumstances, safely use such medications. According to the sample of women reporting on their births, trained dayas are substantially more likely than untrained dayas to use these medications (Table 5). Although in the data from the dayas themselves, trained dayas are not more likely to use medication to speed delivery[6], still, about 20 percent of all dayas do report using such medications, and more than 18 percent of trained dayas report doing so (Table 6). Use of medications such as oxytocin by TBAs during home

[6] The differences between trained and untrained dayas are not significant, in part because the number of cases, particularly of untrained dayas, is small.

deliveries has also been reported elsewhere (Castaneda Camey, et al., 1996; Jeffery, Jeffery and Lyon, 1989).

When this use of medications by dayas in the home was first noticed, there was concern that women might be reporting other kinds of injections or medications that may be less risky as "medicine to speed delivery". This issue was investigated informally, and it was learned that many dayas did use dangerous medications to speed deliveries. In some areas dayas team with a "tumargi" (a low-level medical aide, with little or no formal medical training) from the health facility to deliver these medicines, but some dayas use them on their own. Informal inquiries suggested that injected oxytocin was the preferred means of speeding delivery. The data from the daya's themselves largely confirm this information. Of the 10 dayas who report using medications, 5 always administer them themselves, 3 report always using a "tumargi" to administer them, and 2 say that they sometimes administer them, and sometimes use a "tumargi". When asked what medication they used, however, most dayas were unable to give a specific answer. Just one mentioned oxytocin, while two said cyntocinon. Two were unable to give any sort of answer, while 4 spoke in general terms such as: "the injection to increase contractions", or "the injection to speed delivery". The remaining daya said that she used glucose. It is unclear whether she is confused about what she is actually using, or confused about the intent of the question[7]. Seventy percent of dayas, including some of the dayas who use these medications, recognize that their use is dangerous.

There is the possibility that. even though the training program in no way mentions these medications, their use may actually be indirectly encouraged by the training. This could happen if dayas, and the women who rely on them for delivery, come to believe that the

[7] Many dayas give women in labor glucose or sugar water to give the women strength, and to increase the woman's ability to help in the delivery. This is a recommended procedure and a part of the training program.

training gives dayas the knowledge and skills necessary to use sophisticated medications. A review article on daya training speak of "unwanted side effects of training" (Piper 1997), and this is certainly an example. The dayas in this sample are also reported by the new mothers to use anesthetics and forceps during deliveries in the home. And, though forceps deliveries by dayas are rare, *all* are reported to be done by trained dayas.

In sum, intranatal care has always been the daya's main focus, and the training seems to have improved some of their skills and behaviors. Despite improvements, however, even trained dayas follow recommended procedures in less than half of the deliveries. Moreover, there are unwanted side effects of training that must be firmly addressed in order to reduce dangerous behaviors.

Postnatal Care

Dayas have also had a traditional role in postnatal care--though it has been largely ceremonial. Typically the daya visits the mother and newborn on the seventh day after birth to participate in the naming ceremony. Many dayas also visit before that--often within a day or two of the birth, and certainly by the third day--to check on the woman and baby. Apparently, in the past, these early visits were largely social contacts, with little substance to them. That is, the daya would come, have tea, ask after the mother and baby in a general way, perhaps offer a bit of advice, and leave. The postnatal training sought to take advantage of these visits to have the dayas make a simple examination of the women, and to talk with women about basic nutritional and health messages. Table 7 shows data on postnatal visits by dayas specific for the type of person responsible for the delivery of the baby.

INSERT TABLE 7 ABOUT HERE.

The differences by governorate are striking. In Minya daya visits are common, even when a daya is not responsible for the delivery, indeed may not even have been present. In Qaliubia, however, even in cases where the daya is responsible for the delivery, only 56 percent of women report a postnatal visit from the daya. Overall, both because of this effect, and because daya assisted deliveries are more common in Minya, a much larger proportion of women in Minya receive a postnatal daya visit than is the case in Qaliubia.

Though not included in the training manual, the Ministry of Health official in charge of the daya training program reported that dayas had been trained to conduct simple examinations of new mothers during the postnatal visits. These examinations required only that the daya look at the woman's eyes, lips, chest, hands/arms, stomach, and legs, and ask about discharge. If anything abnormal was noted, the woman should be escorted to a GHF. Beyond this, the training manual did include some basic health messages that the daya could teach the woman. These included information on feeding, especially breastfeeding, cleanliness, vaccinations, and use of ORS for diarrhea. In the birth questionnaire each mother who had received any postnatal daya visit was asked what the daya had done when she made her visit.

The results of the postnatal training are more mixed than seems to be the case for prenatal and intranatal care. It is clear from Table 8 that dayas rarely do much of an examination. In the best circumstances, 10 to about 17 percent of the trained dayas in Qaliubia checked the respondent, and just one of these differences is statistically significant. Untrained dayas in Qaliubia and, in Minya, all dayas, whether trained or not, very rarely checked anything.

INSERT TABLE 8 ABOUT HERE.

Discussions about health messages, on the other hand, are more common, and, in both governorates, trained dayas are more likely to have had discussions than were untrained dayas. Only in Minya, however, is the likelihood of trained dayas having discussions significantly than that of the untrained dayas. Health discussions seem to be a role that dayas fill naturally, and training enhances this role, though in Qaliubia the enhancement is not large. Again, however, at most, only about 30 to 40 percent of the women reported discussing health issues with the daya.

There is, moreover, a question about the quality of the information that dayas communicate. The daya questionnaire included a number of questions to assess the daya's knowledge about some basic nutrition and health issues. There were a number of positive indicators. For example, 75 percent of the dayas thought that mothers should begin breastfeeding within the first hour, and another 19 percent during the first 3 hours of life. All the dayas felt that diarrhea could be dangerous and life threatening, and more than 95 percent thought this to be the case for acute respiratory infection (ARI), as well.

On the other hand, the dayas did not do so well when asked about other issues involving nutrition, health and vaccinations. For example, 35 percent of the dayas recommended that the newborns be given liquids other than breastmilk, mostly sugar water and warm infusions[8]. Many dayas stated that, during a bout of diarrhea, breastmilk, other liquids, and food should be reduced; they were unable to correctly state which was the first immunization an infant should receive; and unable to tell how many polio vaccinations a child should take. While trained dayas generally exhibited somewhat better knowledge than

[8] Giving sugar water to young infants is very common in Egypt. In another study in the same population, the *first* thing given to well over half the babies born was sugar water. By contrast only about one-third were given colostrum or breastmilk as the first thing. In some parts of Egypt, infants are regularly given water or sugar water throughout the first months of life. In these areas "exclusive breastfeeding" (to the exclusion of *all* other foods and liquids) is almost unknown, even among neonates.

dayas without training, this is not always the case, and *none* of the differences is statistically significant. Under any circumstances, there is substantial scope for improvement in the knowledge of both trained and untrained dayas (Table 9).

INSERT TABLE 9 ABOUT HERE.

SUPERVISION

All trained dayas are meant to be assigned to report to a nurse at a local GHF. They are to report births to the nurse, and to contact the nurse when any questions arise. Our results suggest that this aspect of the program works quite well. Of the trained dayas, 95 percent state that they have a file at their local GHF, 77 percent say there is a nurse at that GHF who checks/supervises their work, and just 2 of 30 dayas (7 percent) for whom data are available report that they have NOT seen this person in the past month, while 50 percent report having met the nurse 15 times or more during this period. Three-quarters of the trained dayas report that they register the births they attend. In all of these items trained dayas perform much better than the few untrained dayas for whom we have data.

CONCLUSIONS

There are two important lessons to be derived from this study. First, it is necessary to know what role health workers play in the society before developing training materials. This is particularly evident in the case of dayas and prenatal care. It is evident from all sources of data that dayas play only a very small role in prenatal care. Pregnant women rarely consult

dayas before delivery, because they consider them incapable of providing useful advice or service. Even many dayas agree that this is as it should be. This is not to say that dayas should not be trained in any prenatal care skills. In some cases these skills may be helpful. And certainly the ability to identify risk factors is important no matter when the daya first has contact with the woman. It does seem, however, that the prenatal period ought not to receive a very strong emphasis in the training[9].

Other studies also note the importance of knowing the TBAs role before developing training materials (Scheepers, 1991). One of them, interestingly, argues that this is the case precisely because TBAs in the region studied play a *substantial* role in prenatal care, and this role needs to be fully recognized (Castaneda Camey, et al., 1996). Certainly, whatever the role of the TBA, it needs to be properly understood so that training of and expectations for the TBA will be appropriate.

[9] Note that about 78 percent of women in this sample get at least some care during their pregnancy from either a GHF or a private physician. Although, as noted, only about 4 percent of the women have contact with a daya during their pregnancy, about 54 percent go to a GHF, and among these about 85 percent receive a tetanus immunization. Thus, accepting that the daya does not play a role in prenatal care, does not indicate that pregnant women will not get care.

Second, this analysis demonstrates the limited, and sometimes even negative, impact of the training in affecting behaviors during delivery and the postnatal period when dayas do, or could, play a substantial role. For example, the delivery itself is clearly seen as the daya's main responsibility. Though increasingly women have a doctor or nurse attend their births, dayas continue to deliver a large proportion of births in many parts of Egypt. And it is clear in our data that trained dayas have generally better behaviors than untrained dayas. At the same time, even amongst trained dayas fewer than 50 percent follow the behaviors in which they were trained. And training is associated with some unexpected problems, like the use of forceps and of anesthetics and medications to enhance contractions and speed delivery during deliveries in an uncontrolled environment. Program staff must work hard not only to improve skills, but to counteract these unwanted side effects[10].

In the postnatal period, as well, the training has made some improvements--trained dayas are more likely to discuss health messages with the women, and generally have better knowledge. There remains, however, a long way to go before even the majority of dayas provide correct, basic educational messages, to say nothing of performing a simple postnatal examination. These data suggest that progress can be made, however, and particularly in traditional areas where a high proportion of new mothers receive postnatal visits (including

[10] The dangers of using these medications to speed delivery are more than hypothetical. In a related study, we followed more than 200 pregnant women until 1 month after birth. Of the 197 births that were observed, 6 died during the first month. Of those 6 deaths, at least one was apparently related to (and very likely caused by) medications to speed delivery. In the verbal autopsy performed for this death, the mother described receiving two injections during the delivery. After birth, the newborn "was blue and gasping continuously" ... "she kept gasping until death". The child died 6 or 7 hours after birth.

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many who give birth in hospitals with a doctor in attendance), enhanced skills could improve the health of mothers and their babies.

In the case of the daya training, as is typical of other large health programs (Control of Diarrheal Diseases, Standard Case Management of ARI) in the last 10-15 years in Egypt, dayas were given a short training course, and sent back to work in their communities. The daya program is perhaps unique, however, in that it includes a structure for supervision. The dayas are registered at a local GHF, and assigned to a nurse who can provide them support and guidance. Superficially, this aspect of the program is working quite well, in that the dayas report being registered, being assigned to a nurse, and meeting with this nurse regularly. On the other hand, most of the dayas (more than 80 percent) were trained between 1992 and 1994, some 3 to 5 years before our data were collected. As shown, the performance of trained dayas in late 1997, when the data were collected, though better than untrained dayas, was still far from optimal. Unfortunately we have no indicators of whether the performance of dayas is improving or deteriorating over time. We can, however, compare dayas based on the frequency with which they meet their nurse supervisor (See Table B1 in Appendix B). The number of cases is small, so proper comparisons are not possible, but using the same behavior and knowledge questions shown in Tables 6 and 9 above we see little difference between the dayas who report meeting frequently with the nurse, and those who say they meet less frequently. On some indicators one group appears slightly better, on other indicators the other group. Thus there is no indication in these data that the supervision system works to improve the knowledge and behavior of dayas (Table 10).

INSERT TABLE 10 ABOUT HERE.

In summary, dayas are and always have been primarily birth attendants. They play little role in prenatal care, and have generally not made an important contribution during the

postnatal period. By recognizing these patterns, the training could be more focused, and perhaps have a greater impact. At the same time, the analysis suggests that training alone, at least as this training was conducted, is not sufficient. Though the behaviors of the trained dayas are generally better than those of untrained dayas, the behaviors of even the trained dayas remain far from optimal. And though there is a system of supervision built into the program, it seems to be having little if any effect at improving behaviors over time.

The limitations of the type of training program used with dayas in Egypt have been detailed in the past (Jordan 1989). The fundamental lessons of appropriate training seem not yet to have been learned, however. Still dayas are likely to continue to play a substantial role in intra- and perhaps in post-natal care for some time to come. With information on the role of the daya, and with an effort to provide appropriate training, follow-up, monitoring and incentives, dayas can come to make a greater contribution to the reproductive health of Egyptian women. Unfortunately, however, substantial and sustained enhancement of the services delivered by dayas remains a goal for the future.

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Appendix

In general, dayas in this study are an old, poorly educated group of women. The youngest is 37, while the oldest reports her age to be 86. Almost half (45 percent) are between the ages of 55 and 69. Although the oldest dayas are the least likely to be trained the differences are small. See Table A1.

Almost 60 percent of the dayas have no formal education at all. Interestingly, the dayas with the most education (4 years of primary or more) are the least likely to have been trained (though the numbers are small, and the differences not statistically significant). Even among those dayas with some primary education, 75 percent say that they are unable to read or write. See Table A2.

Eighty-four percent of the dayas interviewed reported that they had been trained, though only about half of these had a **carnet** documenting this training. Of the trained dayas, more than 80 percent were trained between 1992 and 1994.

Among the interviewed dayas who were able to give a numerical answer to the question of how many deliveries they performed each month, most of the dayas in this group (46.5 percent) perform at least 3 (See Table A3), and, on average, they perform 5.9 deliveries per month. But this is clearly not representative of dayas in general. Recall that the selection criterion for dayas to be interviewed was that they had been mentioned at least 5 times by women in the sample of more than 2000 birth questionnaires. In these 2000 questionnaires, there were a total of 1041 times that the name of a daya was mentioned--either for prenatal care, assistance at delivery, or a postnatal visit. In these 1041 mentions there were a total of 297 dayas mentioned for an average of 3.5 mentions per daya. But, just 62 (20.8 percent) of the 297 dayas mentioned were mentioned 5 times or more (Table A4). Of the 62 dayas

meeting our selection criterion of 5 mentions or more, 51 were successfully interviewed. (Two of the mentioned dayas had died, one refused to be interviewed, and the remaining dayas could not be found. The failure to find dayas generally resulted from incomplete names.) These 51 interviewed dayas accounted for 501 (48.1 percent) of the total of 1041 mentions. Thus, though we interviewed just 17 percent of all the 297 dayas mentioned, these 51 interviewed dayas accounted for almost half of all times that some daya was mentioned. It is likely that the dayas with fewer mentions (148 dayas--49.8 percent of all dayas--have just 1 mention, while another 19.7 percent have 2 mentions) are involved in fewer deliveries than are the interviewed dayas. It is also possible that dayas who are rarely mentioned are less likely to be trained, and may therefore have the poorer behaviors associated with untrained dayas. Furthermore, there is the chance that trained dayas with relatively poor behaviors also have fewer mentions, and are under represented in our sample.

While a high proportion of the interviewed dayas conduct at least 3 deliveries per month, only 30 percent of them perform 10 deliveries or more each month. Thus, though in the past, dayas may have "conduct[ed] 100 deliveries a year" (Scheepers, 1991), it is unlikely that very many do so now. In our data only about 6 percent (30 percent of the 20 percent of dayas interviewed) of all dayas are likely to conduct this many deliveries.

TABLES

Table 1. Assistance During Delivery by Region of the Country. All Births in the 5 Years Preceding the Survey. DHS 1995.

Region	Doctor	Trained Nurse/ Midwife	Traditional Birth Attendant	Relative/ Other	No One	Don't Know/ Missing
Urban Governorates	63.1	6.1	26.9	2.7	0.9	0.3
Lower Egypt	42.3	9.1	45.0	2.7	0.7	0.2
Urban	68.4	6.7	22.7	1.2	0.6	0.5
Rural	34.0	9.9	52.1	3.1	0.7	0.1
Upper Egypt	26.0	6.2	60.9	5.2	1.5	0.3
Urban	48.8	10.8	37.4	2.2	0.6	0.2
Rural	18.2	4.7	68.9	6.2	1.7	0.3
Frontier Governorates	46.3	13.0	19.1	19.6	1.9	0.0
Total	38.9	7.4	48.5	4.0	1.1	0.3

Source: El-Zanaty et al. 1995. Table 10.8.

Table 2. Percent of Women Receiving a Home Visit from a Daya During the Course of Their Pregnancy. Minya and Qaliubia. 1994-1996.

	Minya	Qaliubia
Home Visit From Daya	4.0	4.1

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Table 3. Reasons for Going to Source of Care, and Services Received There. Government Health Facilities (GHFs) and Private Doctors. Minya and Qaliubia. 1994-1996.

	GHF		Private Doctor	
	Minya	Qaliubia	Minya	Qaliubia
Reason Attended: Health Problem	16.1	32.6	79.8	77.2
Services Received: TT[1] Only	8.7	24.6	0.0	0.0
TT & Other[2]	33.9	34.5	10.4	19.8
Other Only	56.5	39.4	89.4	79.1
None	.9	1.4	.2	1.1
N	115	142	584	359
Reason Attended: Routine Visit	83.9	67.4	20.2	22.8
Services Received: TT Only	79.5	69.3	0.0	0.0
TT & Other	16.5	23.9	19.6	17.9
Other Only	3.0	6.8	80.4	82.1
None	1.0	0.0	0.0	0.0
N	600	293	148	106

[1] "TT" stands for the tetanus immunization.

[2] "Other" indicates one or more of any examination or test delivered by the service. This would include any examination; recording of height, weight, blood pressure, etc.; taking of blood, urine, or other sample; and so on.

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Table 4. Assistance During Delivery*. Minya and Qaliubia. 1994-1996.

	Minya	Qaliubia
Private Doctor Only	10.1	31.5
Private Doctor & Other	12.7	18.9
Nurse Only	12.6	8.4
Nurse & Daya	1.3	.7
Daya Only	62.7	40.0
No One	.4	.4
N	1124	723

* The difference in the pattern of Assistance During Delivery in Minya and Qaliubia is significantly different at the .001 level.

Table 5. Delivery Practices of Dayas by Training Status. Minya and Qaliubia. 1994-1996.

	Minya		Qaliubia	
	Trained	Not Trained	Trained	Not Trained
Changed Shoes				
Before Delivery	56.7**	61.0	88.7	86.5
Changed Clothes				
Before Delivery	25.7***	7.3	81.2**	62.2
Cut Cord with:				
Scissors	41.5***	14.6	45.2**	29.7
Razor	31.3	73.2	19.9	51.4
Other	3.5	6.5	3.8	0.0
DK	23.8	5.7	31.2	18.9
Sterilized Tools with:				
Boiling Water	46.6***	20.7	48.4**	26.7
Alcohol	4.5	.9	15.9	0.0
Other	33.7	63.0	27.0	50.0
None	5.1	14.7	.8	3.3
DK	10.1	0.9	7.9	20.0
Used Medicine to				
Speed Delivery	24.4**	10.6	33.3*	13.5
Used Anesthetic	17.2**	6.6	17.7	13.5
Used Forceps	4.5	0.0	1.6	0.0
N	467	123	186	37

* Significant at the .05 level.
** Significant at the .01 level.
*** Significant at the .001 level.

Table 6. Delivery Practices as Reported by Dayas by Training Status. Minya and Qaliubia. 1997.

	Trained	Not Trained	Carnet	No Carnet
Usually Cut Cord with:				
Scissors Only	88.4*	62.5	95.5	81.0
Scissors/Other	4.7	0.0	0.0	9.5
Other Only	7.0	37.5	4.5	9.5
Usually Sterilized Instruments with:				
Boiling Water Only	23.3	12.5	27.3	19.0
Boiling Water/Other	62.8	50.0	54.5	71.4
Other Only	14.0	37.5	18.2	9.5
Use Medicine to Speed Delivery:	18.6	25.0	18.2	19.0
N	43	8	22	21

* Significant at the .05 level.

Table 7. Postnatal Visits by a Daya by Type of Assistance at Birth. Minya and Qaliubia. 1994-1996.

	Minya	Qaliubia
Private Doctor	56.1	13.0
Nurse Only	26.8	3.3
Daya Only	95.2	55.6
Total	77.7	29.6

100

Table 8. Postnatal Care by Dayas by Training Status. Minya and Qaliubia. 1994-1996.

	Minya		Qaliubia	
	Trained	Not Trained	Trained	Not Trained
Examine:				
Eyes	3.4	3.1	10.7	3.7
Lips	2.7	1.6	8.2	3.7
Chest	3.6	2.3	16.4*	0.0
Hands/Arms	2.5	2.3	4.9	3.7
Stomach	3.6	2.3	17.2	3.7
Legs	2.7	1.6	2.5	3.7
Discharge	4.8	2.3	8.2	0.0
Discuss:				
Nutrition	9.2**	1.6	24.6*	7.4
Breastfeeding	36.1***	15.6	34.1	22.2
Child Warm	39.2***	18.8	40.5	29.6
Vaccinations	31.1***	14.1	23.0	22.2
Cleanliness	36.1***	16.4	36.5	33.3
N	521	128	127	27

* Significant at the .05 level.
** Significant at the .01 level.
*** Significant at the .001 level.

Table 9. Knowledge of Nutrition, Health and Vaccination Issues as Reported by Dayas by Training Status. (Percent of Dayas Giving an INCORRECT Answer, or Saying "Don't Know"). Minya and Qaliubia. 1997.

	Trained	Not Trained	Carnet	No Carnet
Recommend Giving Liquids other than Breastmilk	32.6	50.0	22.7	42.9
Stop/Reduce Breastfeeding during Diarrhea	53.5	62.5	59.1	47.6
Stop/Reduce Other Liquids during Diarrhea	27.9	50.0	27.3	28.6
Stop/Reduce Other Foods during Diarrhea	69.8	62.5	72.7	66.7
Don't Know First Vaccination	60.5	62.5	59.1	61.9
Don't Know How Many Polio Vaccinations Child Should Receive	57.1	75.0	50.0	65.0
N	43	8	22	21

Table 10. Knowledge of Nutrition, Health and Vaccination Issues and Behavior during Delivery as Reported by Trained Dayas by Frequency of Meeting with their Nurse Supervisor. Minya and Qaliubia. 1997.

	Not Frequently[1]	Frequently[2]
Recommend Giving Liquids other than Breastmilk	28.6	33.3
Stop/Reduce Breastfeeding during Diarrhea	57.1	53.3
Stop/Reduce Other Liquids during Diarrhea	42.9	20.0
Stop/Reduce Other Foods during Diarrhea	71.4	80.0
Don't Know First Vaccination	57.1	60.0
Don't Know How Many Polio Vaccinations Child Should Receive	61.5	66.7
Usually Cut Cord with:		
Scissors Only	85.7	93.3
Scissors/Other	14.3	0.0
Other Only	0.0	6.7
Usually Sterilized Instruments with:		
Boiling Water Only	35.7	20.0
Boiling Water/Other	57.1	53.3
Other Only	7.1	26.7
Use Medicine to Speed Delivery:	14.3	20.0
N	14	15

[1] Dayas who meet with their nurse supervisor "infrequently" do so between 1 and 10 times per month.

[2] Dayas who meet their nurse supervisor "frequently" do so at least 15 times per month. There are 3 dayas who gave the non-numerical answer of "many times" to this question, who are included in this group.

Table A1. Age of Dayas by Training Status. Minya and Qaliubia. 1996.

	Trained	Not Trained	N
Age			
Less Than 55	86.7	13.3	15
55-69	87.0	13.0	23
More Than 70	76.9	23.1	13
Total	84.3	15.7	51

Table A2. Education of Dayas by Training Status. Minya and Qaliubia. 1996.

	Trained	Not Trained	N	
Education				
None	86.7	13.3	30	
Less Than 4 Primary		90.0	10.0	10
4 Primary or More	72.7	27.3	11	
Total	84.3	15.7	51	

Perinatal/Neonatal Mortality and Morbidity Study

Preliminary Result of the Neonatal Data

MORTALITY

The overall neonatal mortality rate is 30/1000. (Note this is based on just 6 deaths) The rate is much lower in Qaliubia (1 death of 75 live births, NNMR 13/1000) than in Minia (5 deaths of 122 live births, NNMR 41/1000) The rate in Qaliubia is lower than we found in the previous work (25/1000), while the rate in Minia is a bit higher than the previous rate (32/1000) The small number of events makes the rates unstable, but this work is also very likely to turn up every event, even more so than our earlier work.

Interestingly, we have more fetal deaths in Qaliubia than in Minia. This is consistent with the higher RATE of fetal mortality in Qaliubia in the earlier work It might be useful to look at fetal mortality a bit more to see if we can identify a possible reason for this result. In general, we expect, and have seen, that mortality is lower in Qaliubia than in Minia

DELIVERY

Most children (67%) are still delivered at home, with a much higher percentage in Minia (76%) than Qaliubia (52%) About 16-17% of women deliver in private clinics in both governorates, while government hospitals and clinics are commonly used in Qaliubia (25%) but not in Minia (5%)

Dayas remain the main attendants at birth, at least in Minia where 59% of women were attended by a daya, against only 42% in Qaliubia Private doctors attended 49% of births in Qaliubia, but just 26% in Minia In both governorates, female relatives were often in attendance as well--Minia 54%, Qaliubia 45%

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Births by Cesarean Section amounted to 8% in Qaliubia, and just 2% in Minia Among the vaginal births, in Minia 95% and in Qaliubia 81% were known to have a normal presentation. The only reported non-normal presentation was leg/feet presenting first in 3% of Minia births and 6% of Qaliubia births. (In Qaliubia, a high percentage (13%) of women reported not knowing the presentation, in contrast to just 2% in Minia.)

Both large and very small babies (based on mother's report--not a birth weight) were more common in Minia (L - 8%, VS - 8%) than in Qaliubia (L - 1%, VS - 3%) As a result normal sized babies were less common in Minia (56%) than in Qaliubia (67%).

The first thing that 58 percent of newborns were given to drink was sugar water (in some cases this would refer to glucose, or saline solution). The level was much higher in Minia (69%) than in Qaliubia (38%). As a result just 44% of children in Qaliubia and 25% in Minia were given breastmilk (or colostrum) as the first liquid Nevertheless, 98% of children in Qaliubia and 88% in Minia were given colostrum and about 98% in both governorates were eventually breastfed About one-third of women in both governorates begin breastfeeding within about an hour, while another 25% begin in the following 2 hours Almost all women begin within the first day or so, although 12 percent in Minia still wait until the third day, or later This most likely reflects the traditional belief that colostrum is not proper breastmilk, and thus these children are likely to be deprived of its benefits

About 32% of babies were given something other than breastmilk on the day before the interview, at both the first visit (when the babies would be about 15-17 days old) and the second visit (when they would be about 29-32 days old). Most commonly, this was some sort of oral medicine (about 25% of babies), but yansoon and mint were also common, particularly in Minia

TREATMENT

There were 121 children who had a symptom that indicated that an event history should be done. Most of these children received some sort of treatment in the home--unfortunately, much of it is classified as other (63% Minia, 56% Qaliubia). The percent of children receiving some sort of medicine in the home was much higher in Qaliubia (56%) then in Minia (25%) (These medicines were generally prescribed by a physician, and only administered in the home This is not necessarily self-medication.) On the other hand, warm liquids were more common in Minia (44%) than in Qaliubia (21%).

Most of these children also got treatment outside the home. More than 60% of the children in both governorates went to a government health facility The percent going to private doctors was also high--though higher in Qaliubia (63%) than in Minia (44%).

Almost always it is the mother who takes care of the sick child.

Diagnosis, Treatment, and Outcomes Among Neonates Admitted to the Neonatal Units of Luxor and Aswan Hospitals

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January 1999

The authors thank Dr Reginald Gipson, Dr Bonita Stanton, Dr Ali Abdel Meguid, Patricia Mechael, the staff of MotherCare, and the staff of the Social Research Center at the American University in Cairo for their contributions and support Funding for the collection of the data was provided by the United States Agency for International Development, through the MotherCare Project, Egypt This report was funded by USAID through the Healthy Mother-Healthy Child Project, Egypt

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INTRODUCTION

For a period of 4 months during the summer of 1998, the care delivered by the neonatal units of Luxor Hospital and Aswan Teaching Hospital was assessed. The assessment consisted of two distinct, but integrated types of data collection.

1) PATIENT SPECIFIC DATA Throughout the four month study period data was collected on all infants who came to the unit--both those admitted, and those who came seeking admission, but were not admitted for whatever reason If an infant was admitted, questionnaires for the admission, for each day the infant remained in the unit, and after the infant's discharge were completed In addition, a questionnaire was administered to the person who brought the infant and to the mother of the infant. Finally, for all infants discharged alive, a visit was made to the home of the infant one week after discharge.

In total, during the 4 months of monitoring the units, 236 infants were admitted--nine of them twice[9]. All of these infants were followed until their discharge[10], even though in a couple of cases this was well after the end of the study

An interviewer visited the unit each day (except Fridays), to record information If a new infant had been admitted since the previous visit of the interviewer, an admission form was completed For each day that the infant remained in the unit a daily follow-up form was completed Of the 237 admitted infants, 179 remained in the unit long enough to complete at least one daily follow-up questionnaire (The other 58 infants were in the unit for just 1 day or less [or 2 days in the case of infants whose short stay included a Friday] and no daily follow-up questionnaire was completed) For these 179 infants there are a total of 703 daily follow-

[9] We do not yet have these infants marked in a way that allows us to do a proper analysis of their signs/symptoms and diagnoses, or other characteristics, independent of the main sample

[10] The only exception are two foundlings (twins) who came to the Luxor unit near the end of the study and were being held until they were at least a month old, at which time they would be moved to an orphanage

up forms, an average of 3.9 per infant. The number of actual follow-up records per infant ranges from 1 to 17, with the great majority (73 percent) of these infants having 4 daily records or less Indeed, 23 percent have just 1 daily record, and an additional 21 percent have just 2 records.

After the infants had left the unit, whether alive or dead, a discharge questionnaire was completed This recorded all the information about what had happened to the infant from the time of the last visit of the interviewer until the time of discharge

In all cases the "respondent" for the admission, daily follow-up and discharge questionnaires was the nurse or doctor responsible for the infant, using the infant's record as the basis for the responses recorded by the interviewer The nurse is the respondent in the vast majority of cases, though occasionally the doctor was the main, or a contributing, respondent For example, the doctor is the respondent for just 10 of the 245 (counting 2 records for infants admitted twice) admission records[11]

2) UNIT SPECIFIC OBSERVATIONS During the final month of work in the neonatal units, observations were made of all the work in the units An observer was present in the unit throughout all 24 hours of the day recording all visits to the unit by doctors, nurses, and any other persons, and recording all actions taken within the unit.

In combination these two forms of data provide a very detailed picture of the care delivered by the units

The following report will present some of the basic results from the monitoring of admissions to the unit, and some very preliminary comments on the observations that were

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[11] The nurses are not only the main respondents for the questionnaires used in this work, but basically run the units The doctors tend to come for brief visits during the course of the day Though not shown in this report, the unit specific observations demonstrate this very clearly Because of the importance of the nurse in running the unit and in keeping records, it may be very useful to train the nurses in making basic measurements and recording these data accurately

conducted. These data remain preliminary, but the patient specific data are now complete and some initial range and consistency checks have been completed. The unit observations are only partial, and have not been checked.

CHARACTERISTICS OF ADMITTED NEONATES AND THEIR PARENTS

For all infants who were admitted, a questionnaire was completed with the doctor or nurse responsible for the infants This questionnaire recorded basic information on when the infant was admitted, gestational age at birth (generally based on obstetrical estimates provided by the infant's family), who admitted the infant, weight on admission, signs and symptoms and diagnoses, what diagnostic tests were done for the infant in the period immediately following admission, what medicines were prescribed, other information on treatment such as intravenous fluids and assistance with breathing, and breastfeeding status A separate questionnaire was used with the person who brought the infant to the unit. This questionnaire included information on who brought the infant, where the infant was born, who attended the birth, age and education of the parents, where the infant came from, and a range of questions about prior treatment, if any, the signs/symptoms noticed, what was being done for the infant at the unit, and how much the infant's treatment cost.

Before beginning the analysis, it is useful to look at two of the basic variables for an indication of the quality of the data These variables are the recorded weights and the reported gestational age

WEIGHT DATA

There are 877 recorded weights in the admission and daily follow-up questionnaires Of these, just 10 (1 1 percent) report the weight of the infant with a degree of accuracy greater than 100 grams Even at the next level of accuracy there is a fair amount of heaping. For

example, 30 percent of weights are recorded on the even kilo, or on the half kilo--that is, 1500, 2000, 2500, 3000 grams, etc. (Twenty percent would be the expected result, if weights were recorded accurately) This is particularly true in Luxor where the heaping on even and half kilo weights exceeds 35 percent In Aswan, on the other hand, this heaping, in the admission data is about 30 percent, while in the daily follow-up data it is considerably lower.

While it is unclear at this time just how important this heaping is, it does suggest a degree of inaccuracy in the recording of this information We have also been told that the scales are often not considered reliable, and were not always well maintained--that is, they were not calibrated, not zeroed out. We will be able to examine some of these issues in greater detail in the near future

GESTATIONAL AGE

These data also seem to have been inaccurately recorded. In Luxor, all the gestational ages are reported in weeks, while in Aswan, all but one of the gestational ages are reported in months This is largely consistent with the stated source of the information. In Aswan, 85 percent of the gestational ages are reported by the mother, or the person who brought the infant to the neonatal unit, with almost all the remaining gestational ages being determined by the doctor In Luxor, by contrast, the doctor is said to have determined 94 percent of the gestational ages But, even in cases where the gestational age is reported by the person bringing the infant to the unit, the figure is recorded in weeks

It is unclear how the doctor determines the gestational age, since the use of the Ballard Score charts is reported in just 2 percent of cases (this is a separate, explicit code in the questionnaire) The values of the gestational ages for Luxor suggest, however, that the number of weeks is simply months of gestation multiplied by 4 (for pre-term infants of 7 and 8

months gestation), and either 38 or 40 weeks for infants reported to have been born at term (See Table 1) The doctor reports completely dominate the recorded ages, but actually have slightly more exaggerated heaping than the reports of the total sample (This is largely due to fewer cases determined by the doctor being reported as unknown.)

Table 1 Recorded Gestational Age for Luxor Total Sample and Determined by the Doctor

Gestational Age	Total Sample	Determined by Doctor
26	1.0	1.1
27	1 0	1.1
28	13 1	13.3
29	1.0	0 0
30	4 0	4 4
32	11 1	12.2
36	5 1	5.6
37	1 0	1 1
38	41.4	43.3
39	2.0	2.2
40	12.1	13 3
Don't Know	7 1	2 2
N	99	90

This heaping raises questions about the accuracy of this important variable It appears that even when the assessment of gestational age is said to have been made by the doctor and recorded in weeks, the doctor is relying on the report of the gestational age--in months--by a member of the family Family members may not know well the actual gestational age

We will show later that both the recorded weight and gestation data are to a degree inconsistent with the reports of prematurity and low birth weight when the respondent is asked for the diagnosis or presenting signs/symptoms In short, these basic data, which can be assessed by simple techniques, give some pause for concern about the accuracy with which some of the basic data have been recorded

BASIC BACKGROUND OF THE ADMITTED INFANTS

Of the 237 admitted neonates, 195 (82 percent) interviews were completed with the person who brought the neonate to the unit. The relatively low percentage of respondents interviewed with this questionnaire resulted largely from difficulties in contacting the appropriate respondent This problem was particularly severe about neonates who were in the unit for just a short time, and unfortunately, these neonates are disproportionately likely to be among those who died However, the following analysis is conducted for the 195 neonates for whom we were able to complete the questionnaire with the person who brought the neonate to the unit

Twenty-four percent of the admitted neonates arrive at the unit within an hour of birth, but fully 53 percent arrived 2 days or more after birth. The former were necessarily delivered in the hospital, and brought immediately from the delivery room--often by a nurse or doctor. The latter were either born at home, or at some outside clinic or health facility (whether public or private), and have generally spent some time at home before coming to the unit In Aswan, neonates arrive at the unit considerably earlier on average. Thirty-two percent arrived within an hour, and just 42 percent two days or more after birth The comparable numbers in Luxor are 13 percent within an hour; 59 percent two days or more.

Thirty-six percent of the infants were born at a government hospital, and 37 percent at a private hospital or clinic Just 25 percent were born at home--either their family home, or another home Thus the neonates admitted to these units are not representative of Egyptian newborns in general in terms of place of birth A study of two different Egyptian governorates, just one of them in Upper Egypt, found that 74 percent of babies were born at home, and in Upper Egypt the percentage is likely to be somewhat higher For example, the

1995 DHS study found that in Upper Egypt, 79 percent of deliveries were in the home, with just 21 percent taking place in a medical facility.

The neonates admitted to the Luxor unit were more likely to be born at home 40 percent, compared to 15 percent in Aswan This disparity may, in large part, account for the difference in delay to arrival in the two units Among those born at the same hospital as the unit, 51 percent arrived in the unit within an hour Among those born at home, 80 percent arrived at the unit 2 days or more after birth

Another indication of the difference between the infants admitted to the neonatal unit and the general population of newborns is that the births of 79 percent of admitted infants had been attended by a doctor, and just 4 percent were attended by a daya (Egyptian traditional birth attendant) In the two governorate study mentioned above dayas were responsible for more than 50 percent of deliveries, while physicians were responsible in just 30 percent of the cases Similarly, the 1995 DHS reports that for Upper Egypt as a whole, 61 percent of births were attended by a daya, and just 26 percent by a physician. Moreover, fully 93 percent of the admitted infants in this study were referred to the unit by a physician Thus, many of the infants who were not delivered by a physician went to a physician before coming to the unit. This high use of physicians by women whose infants are admitted to the unit may reflect the fact that these mothers had anticipated or encountered problems (perhaps because of prenatal care, or intrapartum) and therefore disproportionately chose to deliver at a hospital, or with a doctor in attendance We will consider this question further in subsequent analysis

The mothers of these infants are mostly in their 20s and early 30s (The mean age is 27 years, with a standard deviation of 5 7 years) Just 6 percent are less than 20 years of age (the youngest being 16), and just 14 percent 35 years of age or older (the oldest being 43) The parents are, on average, much better educated than new parents as a whole Just 15 percent of

fathers and 17 percent of mothers have never participated in any formal education, while 57 percent of fathers and 54 percent of mothers have at least some secondary education[12].

A high percentage of the infants admitted to the units are premature and of low birth weight (Tables 2 and 3). Overall, about 22 percent of infants admitted to the units were born before 33 weeks gestation, while 50 percent weighed less than 2500 grams In general, the infants admitted to the Luxor unit were more likely to be premature, and to weigh less than the infants admitted to the Aswan unit. This observation will take on greater meaning when we consider the case fatality rates for each unit below

Table 2 Estimated Gestational Age of Admitted Neonates, by Unit.

Gestational Age	Luxor	Aswan	Total
<= 28 Weeks	15 7	1 7	7 6
29 - 32 Weeks	16.9	12 4	14 3
33 - 36 Weeks	5 6	5 8	5 7
37+ Weeks	61 8	80 2	72 4
N	89	121	210

Table 3 Estimated Admission Weight of Admitted Neonates, by Unit

Weight	Luxor	Aswan	Total
<1500 Grams	16 3	11 4	13.4
1500-2499 Grams	35 9	37 1	36.6
2500+ Grams	47 8	51 5	50 0
N	92	132	224

[12] We can't have comparable data for a representative population of women with newborns in Luxor and Aswan governorates as a whole But we do have comparable data for women who gave birth to live born children during a prospective year in the governorate of Qaliubia in the Nile delta, just north of Cairo We use this governorate, because it has relatively high educational attainment Still 38 percent of the new mothers of live born children in this representative sample of the governorate as a whole had no formal education This is more than twice the level of illiteracy seen among the mothers of neonates admitted to the units in Luxor and Aswan, where we assume the average educational attainment of the population as a whole must be LOWER in these Upper Egyptian governorates than it is in Qaliubia

DIAGNOSIS AND TREATMENT

Diagnoses and signs/symptoms were recorded on the admission questionnaire, on each of the daily follow-up forms, and on the discharge questionnaire. In the analysis below we will focus on the admission and daily follow-up diagnoses and signs/symptoms. Only the most frequently mentioned individual diagnoses and signs/symptoms are included in Table 4 below In a number of important instances there are substantial differences between the patients presenting at the two neonatal units. For example, jaundice, low weight and especially prematurity are much more commonly reported in Luxor than in Aswan On the other hand, respiratory distress, fever, and difficulty with breastfeeding are more commonly reported in Aswan than in Luxor It is impossible to know from this work whether these differences are

Table 4 Attributed Admission Diagnoses and Signs/Symptoms of Admitted Neonates, by Unit[13]

Diagnosis-Sign/Symptom	Luxor	Aswan	Total
Premature	29 7	9.0	17 6
Low Weight	30 7	17.4	22 9
Respiratory Distress	32 7	51 4	43.7
Pneumonia	3 0	6 9	5 3
Blood Infection	5 9	3 5	4 5
Jaundice	34 7	23 6	28 2
Infant of Diabetic Mother	3 0	2.8	2.9
Seizures	11 9	6 9	9 0
Fever	4 0	17 4	11 8
Difficult Suckling	3 0	13 2	9 0
No Admission Diagnosis	2 0	6 3	4.5
No Presenting Signs/Symptoms	83 2	49 3	63.3
N	101	144	245

[13] In the analysis below, some of these categories will be combined to create more meaningful summary categories

actual differences in the occurrence of specific illnesses and signs/symptoms in the two areas, or if these differences result from physicians' preference in the listing of primary diagnoses and/or the availability and choice to use adjuvant diagnostic technology

It is interesting, and perhaps important, to observe that many of the infants admitted who are premature, or low weight are not reported as such in the lists of diagnoses and signs/symptoms (See Table 4a.) Certainly the infants' actual status is strongly correlated with the reported status. But under the circumstances we had expected the reporting to be more consistent with the infants' clinical presentation on admission.

While for gestational age and admission weight we are able to cross check with the stated admission diagnosis for accuracy (Table 4a), for almost all other diagnoses and signs/symptoms we are not able to make such checks due to the inconsistent (almost nonexistent) use of any adjuvant diagnostic technologies (e g. blood culture, chest x-ray, EEG) that may validate the stated admission diagnosis When a newborn is reported to have

Table 4a Percent Reported Premature by Gestational Age and Percent Reported of Low Weight by Recorded Weight, by Unit

	Percent Diagnosed Premature		
Reported Gestational Age	Luxor	Aswan	Total
28 Weeks or Less	92.9 (14)	50.0 (2)	87.5 (16)
29-32 Weeks	86 7 (15)	33 3 (15)	60 0 (30)
33-36 Weeks	20 0 (5)	51 7 (7)	41 7 (12)
37 Weeks or More	1 8 (55)	3 1 (97)	2.6(152)
	Percent Diagnosed Low Weight		
Reported Admission Weight	Luxor	Aswan	Total
1500 Grams or Less	80 0 (15)	66 7 (15)	73 3 (30)
1501-2500 Grams	51 5 (33)	28 6 (49)	37 8 (82)
2501 Grams or More	0 0 (44)	0 0 (68)	0.0(112)

respiratory distress, jaundice, sepsis, seizure, etc. we have no alternative but to rely on the stated information As we will see below, inconsistencies between stated diagnoses and

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treatment raise questions about the accuracy and completeness of the reported diagnostic list--or conversely about the validity of the reported management plans--as well.

The number of cases in some cells of the table 4a is small--particularly in the case of gestational age where the great majority (72 percent) of infants are said to have been born at term, and where the heaping in reported gestations pushes the bulk of preterm infants into the 29 through 32 week group, with relatively smaller numbers in the two groups on either side (See Table 2 above)

The questionnaire included separate lists for diagnoses and for signs/symptoms[14] It was, of course, possible to mention that a given infant had more than one diagnosis and more than one sign/symptom. The average number of diagnoses was about 1.9 in Luxor, and 1.5 in Aswan About 6 percent of infants have 4 or more different illnesses/conditions diagnosed at the time of admission. Both governorates reported a high percentage of infants with no presenting signs/symptoms; Aswan, however, has a substantially higher level of reported signs/symptoms

In the following table we attempt to analyze the probable etiologies contributing to the various admission diagnoses by classifying them according to prematurity/low admission weight The significance of this classification is that the same presenting diagnosis as listed (e g respiratory distress) is attributable to a substantially different underlying list of disease entities for premature infants than for full term infants Respiratory distress seems to predominate the list of admission diagnoses in both units In the case of premature infants, this could be linked with hyaline membrane disease (HMD) which is a disease entity unique to

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[14] The way in which the unit medical staff seem to think about diagnoses and signs/symptoms is, in itself, interesting When asked for a diagnosis the respondent would tend to give not only the diagnosis, but also include any signs/symptoms the infant had For some time this caused confusion among the interviewers As a result there is somewhat greater error in the signs/symptoms variables than elsewhere in this data set. We will be correcting these problems as soon as there is time.

premature babies, and will require fairly sophisticated technology in its management, including some form of mechanical ventilation. We can assume that a large proportion of term infants with the same diagnosis of respiratory distress will, on the other hand, manifest respiratory distress as a sign of sepsis, especially if they survive in the community with no specialized respiratory support for 1 to 2 days

Table 4b Percent of Children with Selected Admission Diagnoses by Prematurity and/or Low Weight

	Premature OR Weight <2500Gr			Term AND Weight >=2500Gr		
Diagnosis/Symptom	Luxor	Aswan	Total	Luxor	Aswan	Total
Respiratory Distress	34.7	60 9	49 6	30 0	46.2	40 0
Jaundice	34 7	21.9	27 4	32.5	30.8	31 4
Sepsis	10 5	25.0	18 6	15 0	30 8	24.8
Seizures	4.1	6.3	5 3	20.0	7 7	12.4
Infant of Diabetic Mother	0.0	0 0	0.0	7.5	6.2	6.7
N	49	64	113	40	65	105

As seen in Table 4b, above, the distribution of the admission diagnoses in both preterm and term infants shows the same rank order. As expected, the diagnosis for infants of diabetic mother (IDM) does not figure in the premature or low weight list. Not surprisingly, jaundice is the second most common diagnosis since these units are probably used by the health care delivery system as a resource for photo therapy in many newborn infants developing this common pathophysiologic entity

We now need to address three specific diagnostic categories in greater detail

1) Respiratory distress Respiratory distress is listed in both units as the most frequent admission diagnosis in both term and preterm infants. The frequency with which it is listed is higher in the Aswan unit, for both categories

Most of the infants presenting at term with respiratory distress will fall under the following categories.

a) aspiration syndromes: these can be substantially reduced with well implemented obstetrical protocols,

b) delayed transitioning of the newborn. this can be easily reversed with proper resuscitation practices, and is usually a short term complication,

c) transient tachypnea of the newborn attributed in most cases to caesarean section deliveries (a rare event in the study sample),

d) sepsis/pneumonia: this probably represents a large portion of the etiologic fraction of this particular diagnosis in term infants It is difficult to determine how much, since none of these babies had any blood cultures on admission.

e) other less predominant etiologies would include: congenital heart disease, or other congenital anomalies of the upper and lower respiratory tract, and neurological disorders.

It is worthy of note that most of these conditions in term infants would not require mechanical ventilation as part of their management plan It is important to institute clear and simple guidelines to identify the most probable etiologic entity for each of these infants and to institute standardized management criteria (diagnostic and therapeutic) for the management of respiratory distress in term / normal weight babies

Premature infants presenting with respiratory distress may be implicated in any of the disease entities mentioned above in term babies. However, an important contributor to respiratory distress in this group is exclusive to premature babies, namely HMD This disease is probably contributing significantly towards the early mortality of premature infants presenting with respiratory distress in these units, and, in many cases, could not be managed without the introduction of some form of

mechanical ventilatory support This is evident from Table 4c where 77.8 (N=27) percent of preterm infants dying in the first days of life had the diagnosis of respiratory distress at the time of admission Again it is unclear whether respiratory distress alone is responsible for these deaths, or whether other contributing diagnoses (identified or not by the medical team) contribute significantly towards this fraction of dead infants.

Table 4c Percent of Infants Dying by Prematurity and/or Low Weight, Admission Diagnosis, and Length of Stay in Unit.

	Premature OR Weight <2500Gr.		Term AND Weight >=2500Gr	
Diagnosis/Symptom	0-2 Days	3+ Days	0-2 Days	3+ Days
Respiratory Distress	77.8	76.5	50.0	60 0
Jaundice	7.4	5 9	0.0	0.0
Sepsis	22 2	11.8	44.0	20.0
Seizures	0.0	5.9	16.7	20 0
Infant of Diabetic Mother	0.0	0 0	5.6	20 0
N	27	17	18	5

2) Sepsis Sepsis is the second major diagnosis listed in terms of its significant contribution to mortality in both the term and the preterm groups. It is very plausible that there is under reporting of this diagnosis by both units since it's presenting signs and symptoms overlap with other diagnostic entities listed, namely respiratory distress, jaundice and seizures. As discussed later, the available technologies have limited the prevailing practices in such a way that the vast majority of admitted babies are suspected of being septic. Most of these infants are started on antibiotic therapy upon admission, and in the absence of lab support that can either prove or exclude sepsis as a confirmed diagnosis, the clinical team continues to administer antibiotics for the entire period of hospitalization Therefore it remains unclear how many of these newly born infants, especially those

that are not immediately admitted to the unit but come to the units from the community, are actually septic. It is also unclear how successful the units are in treating sepsis, since the predominant bacterial strains in these units have not been identified, and the antibiotic selection is therefore, at best, arbitrary, and may not target the organisms successfully

3) Seizures There is an extraordinarily high percentage of babies admitted to both units with this diagnosis The exact etiology is unclear, but it is safe to assume that perinatal asphyxia is a predominant contributor The seriousness of this presenting diagnosis is evident from the fact that it is the third leading cause of early mortality, and the second leading cause in delayed mortality of full term infants (Note the small number of cases among term infants with delayed mortality. These figures must be treated with some caution) Potentially infants surviving with this diagnosis have the greatest likelihood of living with significant long term handicaps, both of a motoric and cognitive nature If, as suggested, neonatal asphyxia is a major contributor it would be anticipated to see an improvement both in the frequency of this as a presenting diagnosis and its associated mortality and morbidity with improved obstetric practices. One of the issues that will require special attention is the unavailability of the first line drug used for the treatment of seizures in the newborn, namely intravenous phenobarbital This drug is apparently not licensed for use at these neonatal units, and that policy will require reassessment, since there is a clear need for this treatment

We also analyzed the mortality classified by prematurity and birth weight according to length of stay in the unit using the discharge diagnoses as listed in the medical records at the time of death As seen in Table 4d, below, respiratory distress predominates as the cause of

early mortality (0-2 days) in the units, in both the premature and full-term infants. On the other hand, sepsis emerges as the leading cause of death in infants dying at 3 days of hospitalization or later This fact is especially striking in the full-term infant group where sepsis is mentioned in 60% of the cases, as compared to 20% diagnosed with respiratory distress (Note the small number of infants in this group) In the premature group of infants, sepsis is mentioned in 35% of deaths at 3 days or more of hospitalization, compared to 29% diagnosed with respiratory distress.

The findings in Table 4d below highlight the importance of emphasizing the selection of meaningful causes of death (not cardiac and respiratory arrest), in the training of physicians practicing in the neonatal units General/obvious categories, such as cardiac and respiratory arrest, are not useful in guiding the practitioners in improving practice patterns associated with specific disease entities When we look at the meaningful categories in the table, the significance of addressing sepsis as an important cause of death is obvious.

The discrepancy in the findings of tables 4c and 4d emphasize the importance of using the discharge diagnosis and not the admission diagnosis in classifying morality. Many infants are admitted with a particular diagnosis, but do not die as a result of this disease, but as a consequence of other diseases that occur/emerge during their hospitalization

In neonatal care, the determination of accuracy of the admission diagnosis and the working diagnosis used to determine a management plan, is dependent upon the initial and evolving clinic impression of the treating physician/nursing team, which is substantiated by

Table 4d Cause of Death by Prematurity and/or Low Weight, Discharge Diagnosis (With OTHER Codes Included), and Length of Stay in Unit.

	Premature OR Weight <2500Gr.		Term AND Weight >=2500Gr.	
Diagnosis/Symptom	0-2 Days	3+ Days	0-2 Days	3+ Days
Respiratory Distress	48 1	29 4	55 6	20 0
Jaundice	7.4	5 9	0.0	0 0
Sepsis	22.2	35.3	38.9	60 0
Seizures	3 7	0 0	11.1	0 0
Infant of Diabetic Mother	0 0	0 0	0 0	0 0
Cardiac Arrest	37 0	35 3	16 7	40 0
Respiratory Arrest	14 8	17 6	5 6	20.0
Cyanosis	14 8	5.9	22 2	20 0
N	27	17	18	5

diagnostic investigations It is evident from the data that we have collected that relatively few diagnostic tests are done, which leads us to believe that the diagnoses listed on the patient's record are predominantly reliant on a clinical impression alone. The questionnaires asked a general question about whether any diagnostic test had been performed since admission or since the interviewer had been there the previous day Just 30 percent of infants (6 percent in Luxor, 46 percent in Aswan) had any form of diagnostic test on admission. Even over the course of a stay in the units many of the patients get no diagnostic test at all (See Table 5.)

If the infant had received a diagnostic test, the nature of the test was asked The options included in the questionnaire were 1) blood, 2) urine, 3) stool, 4) X-ray, 5) lumbar puncture, 6) jaundice, 7) other Of the infants getting diagnostic tests, only blood and jaundice tests were commonly mentioned Of the 703 follow-up records, 204 (29 percent) have at least one diagnostic test mentioned[15] Of these 204 records, 176 (86 percent) mention a blood test and 153 (75 percent) a jaundice test There are NO urine or stool tests and NO lumbar punctures mentioned, in any of the 704 follow-up forms[16] And just 12 of the forms list an X-

[15] Of course, some forms will indicate that a particular infant had more than one diagnostic test since the last visit of the interviewer

[16] The absence of urine tests, stool tests, and lumbar punctures is pervasive There are only 1 or 2 of each of these procedures recorded on all of the questionnaires (admission, follow-up, and discharge) together

ray Even among the blood tests, a preliminary review[17] of the data suggests that the most common reason for doing such a test is to measure the bilirubin level. Other commonly mentioned reasons for the blood test include, in order of descending frequency 1) measuring

Table 5 Percent of Neonates getting NO Diagnostic Tests during their Stay in the Unit, by Length of Stay (Based on the Daily Follow-Up Forms) and Unit.

Length Of Stay	Luxor	Aswan	Total
1 Day	68 8 (16)	40 0 (25)	51.2 (41)
2 Days	73.3 (15)	45 5 (22)	56.8 (37)
3-4 Days	30 4 (23)	23.3 (30)	26 4 (53)
5 Days or More	70.8 (24)	16.7 (24)	43.8 (48)

the hemoglobin, 2) checking blood sugar for diabetes, 3) and determining the blood type Within this context however, decisions are made on treatment. In general, on admission, 89 percent of infants get an IV, of those getting an IV, 96 percent get antibiotics, 65 percent get glucose, and 35 percent get saline Thirty-eight percent of those with an IV get some "other" medicine, but this has not been coded yet In preliminary work, the most commonly mentioned "other" medicine is calcium Very few infants get blood or albumin, though about 6 percent get an anticonvulsant No infant is said to get plasma (and this holds true for the daily follow-up questionnaires as well)

As is evident from the large number of infants getting antibiotics via an IV, antibiotics are given to almost all infants While the standard mode of delivering antibiotics in infants is through an IV, a few infants are indicated to be receiving antibiotics, but not said to be getting

[17] The reasons for doing blood tests was an open question, and these responses have not yet been coded This information is based on a review of a large number of questionnaires in preparation for assigning coding categories

antibiotics from an IV Indeed, of the whole sample, 90 percent are said to be getting antibiotics, while just 86 percent are said to be getting antibiotics from an IV[18]

Another common treatment is the administration of oxygen. In total, 67 percent of the infants were given oxygen on admission.

The patterns of treatment in the daily follow-up data are quite consistent with those based on the admission data discussed in the paragraphs immediately above But the treatment data must necessarily be understood in combination with diagnoses and signs/symptoms from which the infants are said to be suffering. Below we show a few of the main treatments given specific for three common diagnoses--signs/symptoms 1) respiratory distress, 2) jaundice, and 3) sepsis[19]. (See Table 6) Table 6 has two panels. The top panel shows treatment by diagnosis--signs/symptoms for each governorate independently, based on the admission data That is, using the admission diagnosis--signs/symptoms, we look at the treatments the infant was given from the time of admission until the admission form was completed by the interviewer The second panel shows treatment by diagnosis/symptom for both governorates combined using the daily follow-up data These data allow for a different sort of detail to be examined In the case of jaundice, we can split those infants who are reported to have jaundice ONLY from those who have jaundice in combination with another diagnosis--sign/symptom Moreover, for each treatment, we can differentiate between those who

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[18] In total there are 17 infants who are said to be getting antibiotics, who are not said to be getting them from an IV In assessing these data it is helpful to understand the form in which the information was recorded First, it was determined if the infants had an IV or not If there was an IV, the interviewer recorded what the infant was getting through the IV Later, it was determined if the infant was getting ANY medication If so, the medicines, including antibiotics, that the infant was getting were recorded That is, we did NOT record whether the infant was getting antibiotics or not and then ascertain how the antibiotics were being administered Therefore there is greater scope for inconsistency in the responses However, 16 of the 17 infants who are said to be getting antibiotics, but not said to be getting antibiotics by IV are in Aswan Also, in Aswan there are 6 infants who are said to be getting antibiotics by IV, but not said to be getting antibiotics in general--a clear inconsistency We have not yet had time to fully explore inconsistencies of this nature

[19] Sepsis is defined as any infant with one or more of the following 5 diagnoses - signs/symptoms a) pneumonia, b) blood infection, c) diarrhea, d) infected navel, e) high fever

"always" got the treatment--that is on every day for which they have a follow-up questionnaire, from those who got the treatment on only some of the days they were followed. (The difference between 100 0 and the sum of the "always" and "sometimes" figures is the percent who NEVER received the specific treatment)

Table 6 Percent Receiving a Given Treatment by Diagnosis/Symptom and Unit.

Percent Receiving Specific Treatment - Admission Data

	Luxor					Aswan				
Diagnosis/Symptom	IV	Antib.	Light	Oxy	N	IV	Antib.	Light	Oxy.	N
Respiratory Distress	96.8	96 8	9 7	93 3	31	97 1	94.3	2 9	100.0	70
Jaundice	88.6	88.6	91 4	2.9	35	79.4	94.1	88.2	64.7	34
Sepsis[20]	81 8	81 8	0.0	54.5	11	86.5	89 2	16.2	91 9	37

Percent Receiving Specific Treatment - Daily Follow-Up Data

Total Sample

	IV		Antibiotic		Light Therapy		Oxygen		
Diagnosis/Symptom	Always	Some-times	Always	Some-times	Always	Some-Times	Always	Some-Times	N
Respiratory Distress	81 0	16 5	75 9	20.3	1 3	32.9	60.8	29.1	79
Jaundice									
Alone	80 0	8 0	100 0	0 0	88.0	12 0	28 0	12.0	25
With Other Diag/Symp	81 5	10 8	78 5	13 8	33 8	55 4	33.8	23.1	65
Sepsis	80.9	17 0	70 2	21 3	8.5	34 0	61.7	21.3	47

Some points to note in Table 6: On admission, in both governorates, antibiotics are more commonly given for respiratory distress and for jaundice than for sepsis This holds true for those infants with jaundice ONLY in the total sample as well. IV's are commonly given to all infants, in both governorates, irrespective of diagnosis--sign/symptom. In both governorates, oxygen is commonly given to all infants, except for those with jaundice in Luxor Those with breathing difficulties are the most likely to receive oxygen, but 40 percent

[20] The figures for Sepsis in Luxor are based on just 12 cases The most commonly mention symptom of Sepsis (fever) is rarely mentioned in Luxor (See Table 4, above)

of infants with jaundice only also receive this treatment. (This must be mainly in Aswan, since infants with jaundice--whether alone or in combination--are rarely given oxygen in Luxor) It is difficult to determine the need or efficacy of oxygen therapy in these infants without blood gases and oxygen saturations before and after the therapy is given. A priori, however, there is some question about whether infants with jaundice only need oxygen treatment Furthermore we need to account for the potentially dangerous consequences of administering supplemental oxygen when not indicated (e g an increased incidence of blindness due to retinopathy of prematurity or chronic lung disease).

This analysis of diagnoses--signs/symptoms and treatments presents only a few basic findings These are complex data, and sorting out the interrelations between diagnosis and treatment is complicated We present these results only to give a sense of common trends in illness management, and to provide a basis for discussion (which we initiate in the conclusions), improvement in common clinical practices, and further analysis.

OUTCOMES

The function of the neonatal units is to receive, diagnose and treat high-risk newborn infants with serious illnesses that cannot be managed successfully outside the hospital. The units are now, and will always be, faced on a daily basis with realistic difficulties in dealing with certain health problems and with the inevitable constraints of technology and know-how. There will always need to be an ongoing evaluation of the most cost effective use of limited resources, and choices may need to be made based on birth weight related, or diagnosis related expectations . In this section, therefore, we will briefly examine the outcomes for the infants admitted to each of the units, and also briefly look at the treatment that infants discharged alive received during the period immediately before their discharge.

Table 6 Outcome by Gestational Age, Admission Weight and Unit.

	Luxor				Aswan			
Gestational Age	Healthy	Sick	Dead	N	Healthy	Sick	Dead	N
28 Weeks or Less	21.4	0.0	78.6	14	0.0	0.0	100.0	2
29-32 Weeks	73.3	6 7	20 0	15	40.0	6 7	53.3	15
32-36 Weeks	66 7	0 0	33.3	3	28 6	0.0	71 4	7
37 Weeks or More	72 7	3 6	23 6	55	72.2	4 1	23.7	··97
Admission Weight	Healthy	Sick	Dead	N	Healthy	Sick	Dead	N
Less Than 1500 Grams	33 3	0 0	66 7	15	26 7	0 0	73 3	15
1500-2499 Grams	64.5	6.5	29 0	31	67 3	4 1	28 6	49
2500 Grams or More	79 5	0 0	20 5	44	69.1	4.4	26.5	68
Total	66 7	2.2	31 1	90	63.6	3.8	32.6	132

One way of assessing the ability of the units to make reasonable choices and effectively treat infants is to look at the outcome among the infants admitted to the units by admission weight and gestational age. (See Table 7) The outcome has been divided into three groups: 1) healthy, meaning the infant was discharged from the unit, and went home healthy; 2) sick, indicating that on discharge the infant was still sick, and perhaps the discharge was to another medical facility; 3) dead

Although the overall mortality levels in the two units are very similar, with 29 6 percent of admitted infants dying in Luxor and 31 7 percent of similar infants dying in Aswan, the infants admitted to the Luxor unit are, on average, more likely to be premature and of lower admission weight (See Tables 2 and 3, above.) Therefore, in most gestation and weight categories, the Luxor unit had lower mortality (Note again the very small number of cases in some cells of the gestational age panel of Table 6)

There was concern at the beginning of this work that some infants might be discharged because they were on the verge of dying This is said to happen in part to keep mortality in medical facilities artificially low, but also because families prefer that deaths occur at home

To check this, and to assure that infants who left the unit healthy were, in fact, able to survive outside the unit, we visited each of the infants discharged alive one week after discharge. These visits demonstrated that the overwhelming majority of infants who left the unit alive were still living one week after discharge, and even those who died, for the most part lived for several days. Only 1 infant died within an hour of discharge, and another survived just 1 day Thus, there is no evidence that infants on the verge of death are being discharged to die On the other hand, it is likely that these deaths occurring one week or less after discharge are related to the illnesses for which the infant was in the unit, and to the care the infant received--or failed to receive There were 2 such deaths in Luxor and 5 in Aswan. If we add these deaths to the deaths that took place in the unit we find the overall mortality is 31.6 percent of admitted infants in Luxor and 35 3 percent in Aswan.

Another concern is the state of the infants who leave the unit alive. One way of assessing the treatment of the infants is to look at their weight gain during their stay. Infants admitted to these units should be gaining weight before discharge. We are not yet able to evaluate changes in weight in detail, and we have concerns about the quality of weight measurements, as mentioned above However we are able to assess the change in weight between admission and discharge. The picture is mixed.

Table 7a Weight Gain or Loss by Admission Weight Among Those Spending at Least a Minimal Period in the Unit Infants Discharged Alive ONLY

	Admission/Discharge At Least 2 Days in the Unit			
Admission Weight	Gain	Same	Loss	N
Less Than 1500 Grams	42 9	28 6	28.6	7
1500-2499 Grams	37 5	47 9	14 6	48
2500 Grams or More	25 8	39 4	34 8	66
Total	31 4	42 1	26.4	121

Most of the infants manage only to maintain their admission weight, while a substantial proportion of the infants lose weight over time, and are discharged at a lower weight than they entered the unit. This is particularly true of the infants who weighed more than 2500 grams on admission. In addition, Table 7b shows that weight loss was more frequently reported in Aswan, and infants in Luxor are almost 4 times more likely to show a weight gain during the course of their stay in the unit

The issue of weight gain and loss during an infant's stay in the unit, and the relationship to the outcome for the infant is a matter of some interest. Unfortunately the number of cases available is too small to examine this issue in the necessary detail. Below, however, are some simple tables that suggest at least some of the issues that need to be considered

Table 7b. Weight Gain or Loss by Admission Weight and Unit. Infants Discharged Alive ONLY

	Luxor				Aswan			
Admission Weight	Gain	Same	Loss	N	Gain	Same	Loss	N
1500 Grams or Less	50.0	50 0	0 0	4	25 0	25.0	50.0	4
1501-2500 Grams	59 1	40.9	0 0	22	14 7	64.7	20.6	34
2501 Grams or More	33.3	27 3	39 4	33	10 6	59.6	29.8	47
Total	47 5	33 9	18 6	59	12.9	60.0	27.1	85

First consider the outcome by the length of time the infants were in the unit. (See Table 8) Some points to note The pattern of the length of stay of the infants in the two units is remarkably similar (See the "Duration of Stay" Columns in the Right Hand Panel of Table 8) All the infants leaving the Luxor unit within a day of admission are dead The Aswan unit on the other hand admits some infants who are discharged alive within a day The proportions leaving the unit dead on days 1 though 3-4 are very similar, declining steadily in each of the units Among those staying in the units 3-4 days, the infants in Luxor have a small survival advantage over those in Aswan Among those who stay in the unit 5 days or more, however,

the mortality in Luxor continues to decline, and declines substantially from the 3-4 day group. In Aswan, in contrast, mortality among those staying 5 days or more is little different from the mortality of the 3-4 day group, and is very much higher than mortality in the comparable group in Luxor. It should be noted at this point that the overall mortality rates for all weight categories, but most significantly in babies above 2500 grams in both units are pervasively high. Expected mortality rates for these larger babies would be expected to range between 1 and 3 percent, and it can be anticipated that substantial improvements in the survival of infants in this weight category can be achieved with the lowest cost differential, and the highest cost effectiveness.

There are, of course, a number of factors that might increase an infant's risk of dying the longer s/he stays in the unit. Some possible causes, such as exposure to infection, are very

Table 8 Outcome (Alive or Dead) by Length of Stay and Unit.

	Luxor			Aswan			Duration of Stay	
Length of Stay in Unit	Alive	Dead	N	Alive	Dead	N	Luxor	Aswan
Less Than 1 Day	0 0	100.0	15	31.6	68 4	19	15 6	13.8
1 Day	60 0	40.0	10	61.1	38 9	18	10.4	13.0
2 Days	69.2	30.8	13	70.0	30.0	20	13.5	14.5
3-4 Days	81 8	18.2	22	78.1	21.9	32	22.9	23.2
5 Days or More	94 4	5.6	36	79 6	20.4	49	37.5	35.5
						N	96	138

complex and will have to await further processing of the data. One issue that can be examined in a simple way with the data available, is weight gain and loss. These results are shown in Table 9 Briefly, in both governorates, the longer an infant stays in the unit, the less likely the child is to be discharged weighing the SAME as s/he did on admission. In Luxor, however, as infants move out of the "same" column, they tend to move into the "gain" column. In Aswan, by contrast, the movement out of the "same" column tends to be into the "loss" column. That

is, the longer an infant stays in the Aswan unit, the greater are her/his chances of LOSING weight before discharge. This is certainly a matter of some concern, though the issue requires further analysis before we can determine if this is an important contributing factor in mortality. There is an immediate and obvious link between the evolution of the infant's weight during hospitalization, and fluid management and nutrition practices in these units. A much closer look at both fluid management and nutrition practices in these units will need to be incorporated in plans for improving outcomes.

Table 9. Weight Gain or Loss by Duration of Stay and Unit. Infants Discharged Alive ONLY.

	Luxor				Aswan			
Length of Stay in Unit	Gain	Same	Loss	N	Gain	Same	Loss	N
One Day	0 0	83.3	16 7	6	9.1	81.8	9.1	11
Two Days	33 3	44.4	22 2	9	9.1	90 9	0.0	11
3-4 Days	52.9	29 4	17.6	17	18.2	63.6	18.2	22
5 Days or More	59 3	22.2	18.5	27	14 3	34.3	51.4	35
Total	47 5	33.9	18.6	59	12.9	60.0	27.1	85

The observed mortality disadvantage among infants staying in the Aswan unit could be related to increased rates of acquired complications during the hospital stay, particularly nonsocmial sepsis There may also be some concern that the discharge of some of these infants is rushed There do not seem to be criteria for discharge or a follow-up plan. The fact that these infants did not demonstrate consistent weight gain in the hospital makes one wonder about their ability to thrive in the home environment.

There is another possible interpretation to these data. The consistently increasing weight loss over time, and the excess mortality among infants staying in the Aswan unit 5 days or more, may implicate fluid and nutrition practices in this unit It is possible that improper feeding leads to the excess weight loss among the infants in the Aswan neonatal unit, and that

this weight loss is a contributing factor in the mortality among infants who stay in the unit for protracted periods. At this stage this can only be a hypothesis.

We will attempt to assess these hypotheses further in the future. Unfortunately, it may be very difficult to test these alternative hypotheses with the limited number of cases available. We will do what we can with the data available

There is one final issue that we will deal with in this report the treatment that infants were receiving in the period immediately before discharge. Below we present the percentages of infants receiving specific treatments in the period immediately preceding discharge for those infants discharged alive (See Table 10)

Table 10. Percent of Neonates Receiving Specific Treatments in the Period Immediately before Discharge, by Unit.

Treatment	Luxor	Aswan	Total
IV	88.4	65.7	75 0
Antibiotic	88.6	89.0	88 8
Oxygen	4.5	68.7	43.0
N	69	99	168

There is some concern that infants in both units are still dependent, in the period immediately discharge, on elaborate therapies not available in the home environment These data convey an impression of infants who are disconnected from an IV, and removed from their oxygen support, and sent home without being monitored for stability for an adequate period of time off these therapies This view needs to be further examined using the data from the follow-up visits in the homes one week after discharge.

CONCLUSIONS

This report has addressed a number of issues dealing with the treatment of infants in the neonatal units of Luxor and Aswan. Inevitably, a first report of this kind can only present simple numbers that merely scratch the surface of the issues addressed We hope, however, that this analysis will be useful for beginning a discussion of ways of improving the care delivered by the units, and reducing the mortality of admitted infants further.

We will make just a few preliminary comments at this time. We noted that in the overwhelming majority of cases the respondent for these questionnaires was the nurse responsible for the infant. This characterizes the pattern of care in the units as well. The doctors tend to come for brief periods and to perform specific tasks, while the nurses for the most part maintain care in the units Given the importance of the nurses in the units, it may prove useful to train the nurses in record keeping and accurate measurement of basic indicators. This may help the nurses to assist in the decision making about appropriate management of the infants in the unit.

In discussing treatment, we noted the widespread use of antibiotics. The choice to give antibiotics is influenced by the initial impression of whether the infant's presenting signs/symptoms are consistent with sepsis, or whether the infant is at risk for developing sepsis during the hospitalization In both cases the decision is not corroborated with any diagnostic investigations and is, at best, an imperic use of antibiotic therapy An improvement in the approach to antibiotic therapy will require substantial change in

a) the nursery environment and how it is perceived by the care givers as high risk for hospital acquired infections;

b) enhancing the hospital lab capability to conduct direct and indirect methods for the diagnosis of sepsis in newborns;

c) educating the caregivers regarding the risks of administering antibiotic therapy prophylactically, especially the risk of developing antibiotic resistant bacterial strains in the hospital environment;

d) emphasizing procedure related and environment related infection control and aseptic techniques to ensure the safety of the nursery environment.

The prevalent use of unmonitored oxygen therapy is also a serious concern. It may represent a wasteful use of limited resources, but could also represent an unnecessary exposure of these infants to a relatively hazardous form of therapy.

It is evident from this report that any serious consideration for programs that will influence practices and outcomes in these units will have to include an upgrade of existing hospital based diagnostic technologies. Although such upgrades may appear to be separate from the neonatal unit functions, they are integral to the ability of the health care providers to arrive at more accurate diagnoses, and their ability to monitor the success of their management plans.

Finally, an emphasis on educating the clinical staff on discharge planning, especially for the smaller and sicker infants, is needed. Guidelines on progression of weight, stability of the infant with usual care, and plans for the survival of the discharged infant outside the hospital environment, should be developed at these units.

We expect to continue with a more detailed analysis of the patient specific data, and to include consideration of the unit specific observations We expect this further analysis will shed more light on some of the issues covered only briefly in this report.

Observations in the Neonatal Unit in Luxor and Aswan

Preliminary Results

INTRODUCTION

Over the course of a one month period from mid-August to mid-September 1998 trained observers watched the functioning of the neonatal units in Luxor General Hospital and in Aswan Teaching Hospital The observers were in the units for 24 hours a day, every day except Friday On most days there were 3 "shifts" of observation, each lasting 8 hours (On a few days, there were two, 12 hour shifts because one of the interviewers was unavailable) The observers recorded certain basic information about the unit at the beginning and end of each shift--how many neonates present, how many nurses, etc. They also noted certain changes during the shift--admissions and discharges of neonates, nurses arriving and leaving, efforts to call a doctor for a special visit

These basic data, however, simply provide the background for the detailed observation of the work of the unit These data were recorded in a series of tables. The first table provided a line of information each time a doctor, nurse, or any other person entered the incubator room. (For convenience, we refer to these entrances as "visits".) This table consisted of a large number of columns, each recording specific information about the visit. The first few columns record aseptic behaviors handwashing, changing/covering the shoes, etc The remainder of the columns record all the actions the person who entered took while in the room changing/cleaning/feeding the neonate. conducting an examination, giving medicine, arranging equipment, whatever There are a total of 20 specific actions that were recorded These are either common actions, or actions that were considered to be of particular importance There is a final column to record any other action that was taken, but

that was not covered by one of the specific columns. For each specific action taken; the ID number of the neonate who was the recipient of the action was noted This allows us (at some time in the future) to link actions to specific neonates, and to correlate this with the outcome of the stay in the unit

During the training, it was observed that, particularly in the Luxor unit, there were a large number of visits that were not related to the work of the unit. That is, no specific actions were taken--not even observation of the children. These visits were recorded on a separate, shortened version of Table 1, in which only the aseptic behaviors were noted

If more than one neonate was tended to during a single visit, Table 2 records the aseptic behaviors that were taken between neonates. That is, if, on a single visit to the unit, the doctor/nurse first adjusted the IV needle of one neonate, then moved to examine a second neonate, and finally changed the bag of IV fluid for a third neonate, there is one line of information for each of the neonates visited--in this case 3 lines. The observer noted the ID of the neonate involved, the type of actor (doctor/nurse/mother), the degree of contact with the neonate, and then whether hands were washed between children, and whether gloves were worn, and, if so, whether changed between children.

The two remaining Tables 3 and 4, record the exact time that each nurse and each doctor enters and leaves the unit. This will allow us (some time in the future) to determine when and for how long there was no health professional in the unit

BASIC DATA

The basic data include information on the number of neonates in the unit at the beginning and the end of each shift; of these, the number being given oxygen, or with an IV, the number of nurses present at the beginning and end of the shift; whether a nurse was

present in the unit at all times during the shift, whether a doctor came at any time during the shift; whether a doctor was called, why, and how long it took her/him to come, and whether any of the incubators were cleaned during the shift, by whom, where, and with what.

Table 1 shows the mean number of neonates and nurses at the beginning of shifts, along with the mean number of neonates receiving oxygen, on a respirator, or with an IV

Table 1 Mean Number of Neonates and Nurses in the Unit at the Beginning of the Shift, and Other Means, by Governorate.

	Luxor	Aswan
Neonates	4 05	4 31
Neonates Admitted during Shift	.43	.71
Nurses	98	1.90
Neonates on Oxygen	76	2.95
Neonates on Respirator	0.00	1 05
Neonates with IV	1.31	2.58
N	84	76

Though the Luxor unit is much smaller than the Aswan unit--that is, a smaller room, fewer incubators, less facilities--the average number of children in the units is very similar At the same time the mean number of children admitted to the Aswan unit is somewhat higher. This suggests a higher turn-over of children in Aswan. In addition, the use of the Luxor unit is more constant That is, in both units the modal number of neonates present at the beginning of the shift is 4. In Luxor, however, 4 neonates are present at the beginning of 46 percent of the shifts, while in Aswan 4 neonates are present at the beginning of just 28 percent of shifts. In Aswan, it is more likely that both fewer or more neonates are present For example, 2 neonates are present at the beginning of 8 percent of shifts in Luxor and 11 percent of shifts in Aswan At the other end of the continuum, 7 neonates were present in Luxor just 1 percent of the time and in Aswan, 8 percent of the time

And though the Luxor and Aswan units have similar numbers of neonates present at the beginning of the average shift, the differences in the mean number of nurses present, and of children receiving the key treatments recorded are much greater The mean number of nurses present in the Luxor unit is actually slightly less than 1 This is because in about 98 percent of the shifts just one nurse is present in Luxor, while in a few cases, there was no nurse present at the beginning of the shift But, on average, there are almost twice as many nurses present in Aswan than in Luxor

The greater number of nurses present in Aswan is consistent with the greater number of children being treated with key interventions in Aswan. For example, in Aswan in the average shift almost twice as many children have an IV and more than 4 times as many are receiving oxygen. Moreover, in Aswan at least one child is on a respirator during 43 percent of shifts, while during the entire month of observation no children at all were on a respirator in Luxor

This greater use of treatments in Aswan is interesting also because based on objective criteria such as gestational age and admission weight, the neonates admitted to the Luxor unit are sicker than those admitted in Aswan (see Langsten and el-Mohandes 1999, Table 3). Moreover, the level of mortality in Luxor is the same or LOWER than mortality in Aswan controlling for gestational age and admission weight (see Langsten and el-Mohandes 1999, Table 6) Thus the greater use of treatments in Aswan is inconsistent with the data from the individual level data on the seriousness of these children's illness and on their likelihood of a favorable outcome It may be useful to examine this in greater detail at a later time

Table 2 shows the percentage of shifts during which other key events took place. The very poor performance of the Luxor unit in having a nurse present at all times during the shift is not surprising given that, in general, just one nurse is assigned to the unit for a 12 hour shift

each day If this nurse needs anything from elsewhere in the hospital, or has any personal business to attend to, necessarily the unit will be without any attendant for some time It is perhaps more surprising that the Aswan unit has so few shifts when a nurse is always present, given that there are generally at least 2 nurses assigned to the unit at each shift, and that there

Table 2 Percent of Shifts when Nurse Present Throughout the Shift, when Any Doctor Visited and Other Indicators, by Governorate

	Luxor	Aswan
Nurse Present Throughout	2.4	30.3
Any Doctor Visit	91.5	91.9
At Least One Doctor Called	23.8	32.4
Clean Any Incubator	17.9	35.5
N	84	76

are a large number of nurses who work at the unit at one time or the other In further analysis we will be able to determine how long are the periods when there is no attendant in the unit

At least one doctor makes at least one visit to the units during more than 90 percent of the shifts, but doctors are still called to the unit during about 24-32 percent of shifts. Incubators are cleaned during 18 percent of shifts in Luxor and twice as often in Aswan

VISITS TO THE UNIT

During the course of the month of observation there were almost 1600 recorded entrances into the unit in Luxor and more than 3600 entrances into the Aswan unit. Note that this implies more than 40 entrances per 8-hour shift in Aswan, and about 20 entrances during the same period in Luxor. For each of these entrances (or visits as we'll call them more often), the observer recorded: who entered; did they wash their hands, change/cover their shoes, put on a clean jacket, wear gloves; and what actions were performed. The actions included changing the neonates clothes, cleaning the neonate, feeding the neonate, conducting an examination, clearing the neonates breathing passage, taking a sample, disinfecting an IV,

doing an X-ray, putting the "jaundice" lamp on the incubator, putting an IV in the neonate, putting topical medicine on the neonate, putting the "canula" in the neonate, changing the bag of IV solution, putting in a new IV needle, putting in a naso-gastric tube, changing the bag of naso-gastric fluid, giving the neonate medicine by mouth, giving the neonate medicine by injection, disinfecting the place from which a sample is drawn, and other actions

Table 3 shows the distribution of who enters the unit. Most of the visits in both units are by the nurse But in Luxor there are a substantial number of visits by the mother and father of the neonates and by other relatives. In Aswan by contrast there are very few visits by these categories of people, and the visits by nurses are proportionately more.

The issue, however, is not so much the number of visits, but whether aseptic conditions are maintained in the unit, and especially whether the neonates are protected from infection when they are handled or treated To assess the quality of this aspect of care we can look at the degree to which aseptic procedures are followed by particular types of staff, and during specific procedures.

Table 3 Percentage Distribution of the Visits to the Unit by Type of Person Visiting and Governorate

	Luxor	Aswan
Doctor	16 7	16 3
Nurse	54 7	80.7
Mother/Father	14.3	0.0
Other Relative	13 0	1 8
Cleaning Staff	1.3	1 2
N	1590	3629

Table 4 shows overall compliance with aseptic procedures for the two units in the first panel, and then the compliance for doctors and nurses per se.

We can see clearly in both panels that compliance in Aswan is much higher than in Luxor Even in the case of handwashing, the most important of the procedures, compliance

Table 4A. Percent of ALL Visitors Complying with Each Aseptic Procedure by Governorate.

	Luxor	Aswan
Wash Hands	5 6	22.9
Change/Cover Shoes	0 0	32.5
Wear Clean Coat	0 0	18.6
Wear Gloves	.2	2 9
N	1590	3629

in Luxor is very poor In Luxor the compliance of both doctors and nurses is equally poor In Aswan, however, doctors do generally better at hand washing and changing/covering their shoes, while nurses are more likely to wear a clean coat

Table 4B Percent of Visits on which Health Professionals Comply with Each Aseptic Procedure by Type of Health Professional and Governorate.

	Luxor		Aswan	
	Doctors	Nurses	Doctors	Nurses
Wash Hands	6.8	8.3	32 6	21.7
Change/Cover Shoes	0 0	0 0	50 5	29.5
Wear Clean Coat	0 0	0 0	12.8	20.2
Wear Gloves	.4	.2	2 2	3 0
N	265	867	592	2719

Before examining aseptic behaviors with actions taken it is useful to look at what actions are done by the health professionals in these units, and their prevalence Table 5 shows the percentage of visits on which each type of health professional performs each of the actions observed From Table 5 it is clear that there are some functions that are performed primarily by nurses (cleaning and feeding the neonates) and other functions that are mainly the responsibility of the doctors (observations and examinations) This is not surprising. But most of the other actions, all of them relatively uncommon, are shared to a substantial degree.

As mentioned previously, given that aseptic behaviors are not followed at all times there is a question of whether they are more commonly practiced when the procedures done on the visit are more invasive. Because most actions are rare, at this time we have done this only for a couple of actions that are among the most common.

Table 5 Percent of Health Professionals Complying with Each Aseptic Procedure by Type and Governorate.

	Luxor		Aswan	
	Doctors	Nurses	Doctors	Nurses
Change Ns Clothes	0 0	12 4	1.2	25 8
Clean N	4	10.8	.9	22.9
Feed N	1 5	27 6	1 4	18 7
Observation ONLY	19 0	2.4	51.3	21.7
Examination	35 2	8	35 6	8 7
Clear Breathing Passage of:				
Blood	2.7	6.0	2.2	1.1
Sputum	10 7	11 0	2 6	4 5
Take Sample of:				
Blood	1 5	1 3	1 5	2 9
Urine	2.7	5 1	.8	1 0
Stool	.8	.2	3	.3
Disinfect IV	.8	.7	1.0	1.2
X-Ray	.4	.7	.2	.1
Place Light Machine	8	2 0	1.8	8 7
Put IV Apparatus on N	1.9	.6	3.1	.6
Apply Topical Medicine:				
Drops	.4	1.7	1.1	4.2
Lotion	8	2.5	1.3	2.7
Disinfectant	1 1	4.2	.7	1.6
Put "Kanula"	5.7	3.5	6 4	2.4
Change IV Solution	2 7	5.2	9	1 7
Disinfect Place for IV Needle	8	8	4	7
Put Naso-Gastric Tube	1 1	2.5	1.1	.8
Change Naso-Gastric Fluid	0 0	1 4	0 0	1.2
Give Medicine by Mouth	4	3.4	6	1.7
Medicine by Injection in				
Muscle	1 5	2.4	1.3	3 5
Vein	7 3	6 5	7 1	8 2
Disinfect Place to Take Sample	8	1	1 8	2 9
N	261	842	548	2719

Table 6 shows these relationships For this analysis we look at Observation ONLY for both doctors and nurses. This we considered to be a non-invasive action. As a representative of a more invasive action we look at Examination for doctors, and feeing the neonate for nurses These are selected on a purely pragmatic basis They the only actions that have a sufficient number of cases to allow us to make reasonable comparisons.

Again, compliance with hand washing is consistently poorer in Luxor And only in some cases do health professionals adjust their hand washing to be more appropriate to the action they are undertaking. For example, doctors in Luxor are no more likely to wash their hands before examining a neonate than they are before making a simple observation Similarly nurses in Aswan are no more likely to wash their hands before an observation than before feeding On the other hand, nurses in Luxor and doctors in Aswan do seem to modify their behavior somewhat to conform to the action they will be taking in the unit

Table 6 Percent of Visits on Which Health Professionals Wash Their Hands by Type of Professional, Action Taken, and Governorate.

	Luxor				Aswan			
	Doctors	N	Nurses	N	Doctors	N	Nurses	N
Observation ONLY	10.0	50	10 5	19	33.3	303	31 8	628
Examination	10.9	92	- -		55.6	207	- -	
Feed the N	-.-		21 9	233	- -		30.5	541

In summary, however, it is important to reemphasize that compliance with aseptic procedures is poor in both centers, by all types of personnel, and in all circumstances

Finally, we'll present a bit of data on "other" visits to the neonatal unit. It was noticed during the final pretesting and training in Luxor and Aswan that there were frequent visits to the units by people who had no particular work there. These are people who enter the unit for some purpose other than to deal with the neonates in the unit. They might come to get some supplies that are stored in the unit, or perhaps just to talk with the nurse in the unit. Since none of the "actions" in the data we have just analyzed apply to these visits, it was decided to record them on a separate form.

The basic data for these visits are presented in Tables 7 and 8. In Table 7 we can see that "other" visits were much more common in Luxor, and that these were mostly visits by nurses. In Luxor "other" visits were almost as common as regular work visits, while in Aswan

the "other" visits were relatively rare, and amounted to just one-tenth the number of regular visits.

Table 7 Percentage Distribution of the "OTHER" Visits to the Unit by Type of Person Visiting and Governorate.

	Luxor	Aswan
Doctor	4 6	6 1
Nurse	74 4	48 7
Mother/Father	1 1	1.9
Other Relative	12 3	37 3
Cleaning Staff	7.6	6.1
N	1309	314

Table 8 shows that aseptic behaviors were even less common during other visits than they were during regular visits. This is not surprising. Most of these visits lasted just a short time, and the people making the visit probably didn't see a need to comply with these behaviors since they had no intent to deal with the neonates. There remains a concern, however about the additional traffic and exposure to infection that these "other" visits engender.

Table 8A. Percent of ALL "Other" Visitors Complying with Each Aseptic Procedure by Governorate

	Luxor	Aswan
Wash Hands	.5	1 3
Change/Cover Shoes	0 0	10.6
Wear Clean Coat	0.0	0.0
Wear Gloves	2	0 0
N	1306	314

8B Percent of "Other" Visits on which Health Professionals Comply with Each Aseptic Procedure by Type of Health Professional and Governorate.

	Luxor		Aswan	
	Doctors	Nurses	Doctors	Nurses
Wash Hands	4	3 3	0 0	2.0
Change/Cover Shoes	0.0	0.0	10.5	1 3
Wear Clean Coat	0 0	0 0	0 0	0.0
Wear Gloves	2	0.0	0.0	0.0
N	60	72	19	153

DISCUSSION

There are just two points I'd like to emphasize at this time One is the role of bias in data collection of this type, the other is the inconsistency between the observed measures of quality of care delivered by the two units and the outcome they achieve in terms of survivorship of admitted neonates.

Bias

It is well known that studies involving direct observation are likely to suffer some bias. It only stands to reason that someone knowing s/he is being observed will modify her/his behavior to conform more closely to expectations. In the case of this research the doctors and nurses knew that an observer was recording their actions, and knew what behaviors and actions were being recorded. This is particularly significant with regard to the aseptic behaviors Consider handwashing, the most important of these behaviors. Even though the doctors and nurses know (or at least should know) that hand washing is essential to avoiding the spread of infections; even though they know that they should thoroughly wash their hands every time they enter the unit, and every time they move from dealing with one child to the next; and even though they know that the observers are recording whether they comply with this behavior or not Despite all of this, compliance with handwashing is very poor, particularly in Luxor

This is a worrying result It suggests that though the health professionals in these units know what behaviors are expected and why they are important, they don't feel the need to follow them--even when their failure to do so is being observed and recorded. This implies behavior that is very difficult to change Additional training is unlikely to be sufficient Better structures of supervision and rewards and punishments may be necessary, but may still be insufficient, to bring about a change in behavior It would seem that the health professionals in

these units simply do not see hand washing, and other aseptic behaviors, as important. Convincing that these behaviors are important is the task that needs to be done. And I suspect that this task is not easy.

Inconsistencies in the Data

In the data presented in this report on observed quality of care delivered by the neonatal units in Luxor and Aswan, Luxor appears to provide lower quality in just about every area examined. Staffing is less adequate, and the unit is more likely to go for periods with no one in attendance, and it seems that incubators are less likely to be cleaned. Aseptic behaviors are less commonly followed, even (more precisely perhaps, especially) when the actions taken are invasive. Yet despite the seemingly lower quality of care in Luxor, the likelihood of surviving among neonates admitted to the Luxor unit is lower than it is among those admitted to Aswan. Since it is assumed that compliance with aseptic behaviors has a positive (rather than negative) effect on survivorship of admitted neonates, we have to look elsewhere for the reasons that the mortality in the Aswan unit is higher, even after controlling for gestational age and admission weight.

This perhaps reemphasizes the importance of an observation made in our earlier report that the disparity in death rates among admitted neonates grows sharply among those neonates who have spent longer periods in the units (Langsten and el-Mohandes 1999, Table 8). Among those staying just a few days in the units the mortality in Aswan is the same or slightly lower than mortality in Luxor But beginning with those neonates who have spent at least 3 days in the units, mortality in Aswan begins to exceed that of Luxor. The disparity is particularly great among those neonates who spend 5 days or more in the units. In Luxor, just 5.6 percent of these neonates die, compared with 20.4 percent of similar neonates in Aswan. In combination with the data showing that neonates who are discharged alive after 5 days or

more in the Aswan unit are more likely to lose weight than to have gained it, as opposed to the Luxor unit where the opposite is true, these results suggest that issues such as basic feeding and nutrition may be important factors contributing to excess mortality in these units at this time

These concerns will be addressed in further analysis of the individual level data from these units

Prospective Birth and Death Rates

Minia and Qaliubia

1995-1996

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February 1998

INTRODUCTION

During a 12 month period from late 1995 through 1996 we followed 3000 households in each of two governorates--Minia and Qaliubia. All 6000 households were first interviewed in the last half of 1995, and followed at intervals of about 3 months. Four follow-up visits were made to all households, for a total follow-up period of 1 year. The final visit was made at least 12 months, but in some cases as much as 14 months, after the baseline interview.

At the baseline, all ever-married women 15-54 years of age were interviewed about their past pregnancy history, and about their current marital and pregnancy status.

During the prospective year, at each visit, each woman's current marital and pregnancy status was ascertained. All currently married women were asked if they were currently pregnant. If so, the duration of their pregnancy was recorded. If they thought they might be pregnant, but were unsure, the length of time since their last monthly menstrual cycle was noted. The questionnaire used for recording this information was the same in each round. Thus, the interviewer had available to her at the time of the each interview the woman's pregnancy status, and the duration of any pregnancy, in previous rounds. Even if there was no pregnancy recorded in previous rounds, the interviewer asked whether the woman had had any pregnancy that ended; whether in a live birth, stillbirth, miscarriage, or abortion; since the previous visit. This was to ensure, to the extent possible, that even those pregnancies that had

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been unnoticed or unreported, or that ended in early fetal mortality, were recorded. Specifically, the questions asked were:

1) Did any pregnancy end since the last visit?

2) Was the child born alive or dead, or did you have an abortion?

3) Is the child still alive?

These "current status" questions provide the basic data for the prospective birth rates. These are the correct data to use, since they reflect events that have happened since a woman entered the sample. Most importantly, they exclude events that took place during the prospective year that should not be included in the computation of rates. For example, there were a number of married women who migrated into sample households during the course of the year. Some of these women had had births after the start of the research, but before they entered the sample. These events should be, and have been, excluded from the rates because they occurred to the woman before she was a part of our study[1]. These events were recorded in the pregnancy history, but not in the current status data.

Because the current status data are central to the computation of the prospective rates they were thoroughly checked. The checks are described at the end of this report.

RESULTS

Recall that the current status data recorded all pregnancy terminations--whether live births, stillbirths, miscarriages or abortions. It was essential to follow all such events because we were interested in the events surrounding fetal deaths as well as live births, and because we

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[1] This is a conservative approach to inclusion of birth, because we considering a woman a part of the sample household only from the time an interviewer first registers her, and she is excluded from the sample from the date of the last visit during which she was present in the household. It is possible that some women entered the sample household, and then gave birth before the interviewers visit. Conversely, a woman resident in the sample may have given birth after a visit, and then migrated out before the following visit. All births in these circumstances, though clearly a part of the sample are excluded. The number of such events is likely to be very small.

want to measure perinatal mortality, as well as birth rates and more standard infant and child mortality rates. Table 1 shows the distribution of all pregnancy terminations by duration and outcome.

Table 1 All Pregnancy Terminations by Duration and Outcome (Born Alive or Dead). Minia and Qaliubia. 1995-1996.

	Minia		Qaliubia		
Duration	Alive	Dead	Alive	Dead	Total
LE 4 Mo.	0	50	0	18	68
5 Mo.	0	4	0	2	6
6 Mo.	0	1	2	1	4
7 Mo.	7	0	3	0	10
8 Mo.	5	3	6	0	14
9 Mo.	525	3	321	5	854
DK	0	0	1	0	1
Missing	50	11	30	6	97
Total	587	72	363	32	1054

Fertility and mortality rates for Minia and Qaliubia for a prospective year during 1995-1996 are presented below. First some definitions

Fertility Rates:

1) Crude Birth Rate: The number of births in a year, divided by the total estimated mid-year population.

2) Age Specific Fertility: The number of births to women aged X through X+4 during a year, dividing by the estimated mid-year number of women aged X through X+4.

3) Age-Marital Specific Fertility. The number of births to married women aged X though X+4 during a year, divided by the estimated mid-year number of married women aged X through X+4

4) Total Fertility: The number of births the average woman would expect to have during her lifetime, if her fertility during her lifetime were consistent with current age specific fertility.

Mortality Rates:

1) Perinatal: Fetal deaths after 22 weeks gestation plus live births that die during the first 7 days of life--all during a one year period, divided by the total number of pregnancies lasting at least 22 weeks during that same year.

2) Neonatal: Deaths to live born children during the first 28 days of life during a year, divided by the total number of live births during that year

3) Postneonatal: Deaths to live born children between 28 days and 1 year of life during a year, divided by the total number of live births during that year

4) Infant: Deaths to live born children under exact age 1 year during a year, divided by the total number of live births during that year.

5) 1-4: Deaths to children between exact ages 1 year and 4 years during a year, divided by the estimated mid-year number of children aged 1-4.

6) Under 5: Deaths to children under exact age 5 years during a year, divided by the estimated number children under age 5 during that year.

During the prospective year of our research there were 589 live births in Minia and 365 live births in Qaliubia. The crude birth rates are 34 births per 1000 population in Minia and 24 birth per 1000 population in Qaliubia.

Age-Specific (ASFR) and Age-Marital-Specific (AMSFR) fertility rates for Minia and Qaliubia are presented in Table 2. The total fertility rate (TFR) is shown at the bottom of the panel for each governorate. The age-specific and age-marital-specific rates look sensible, and are internally consistent. The total fertility rates--Minia 4.77 and Qaliubia 3.27--are very similar to those reported in the 1995 DHS survey for Upper Egypt--4 73, comparable to Minia, and for Lower Egypt--3.22, comparable to Qaliubia. Our TFRs are just slightly higher than those reported in the 1995 DHS, but this may imply a greater difference than is apparent. This is because, in an environment where fertility is declining--as strongly evidenced by the results for a series of surveys show in the 1995 DHS report, Table 3.3, the DHS rate which covers the period 1993 through 1995 should be clearly higher than our rate which covers a

later period, 1995-1996. Moreover, we are assuming that Minia is closely approximated by Upper Egypt as a whole, and that Qaliubia is approximated by Lower Egypt. In the case of Minia it is a difficult to assess this assumption. But, we would assume that Qaliubia, which is far more urban, and generally better educated and wealthier, than most of Lower Egypt, should have somewhat lower fertility than Lower Egypt as a whole. Still, the similarity of rates helps us to feel comfortable that all the data involved are of good quality.

Table 2 Estimated Number of All- and Married-Women, Births, and Age Specific Fertility Rates for All- and Married- Women. Minia and Qaliubia. 1995-1996.

	Age Group	Mid-Year Population	Mid-Year Married Population	Births	ASFR	AMSFR
Minia	15-19	1007.0	219.5	95	.094	.433
	20-24	696.0	479.5	180	.259	.375
	25-29	626.0	559.5	159	.254	.284
	30-34	419.0	385.0	75	.179	.195
	35-39	528 0	474.0	60	.114	.127
	40-44	382 5	337.0	18	.047	.053
	45-49	304.0	243.0	2	.007	.008
	TFR				4.77	
	Total Births			589		
	TFR - Upper Egypt - 1993-1995				4 73[1]	
Qaliubia	15-19	920.5	75.5	40	.043	.530
	20-24	614.5	338 0	107	.174	.317
	25-29	520.5	457.0	115	.221	.252
	30-34	461 0	430 0	60	.130	.140
	35-39	568.0	531.0	35	.062	.066
	40-44	357.0	317.0	6	.017	.019
	45-49	308 0	262.0	2	.006	.008
	TFR				3.27	
	Total Births			365		
	TFR - Lower Egypt - 1993-1995				3.22[1]	

[1] Source. DHS 1995.

A few additional comments about these birth rates. As expected age-specific fertility in Qaliubia is lower at every age, than is fertility in Minia. The highest fertility in Minia is among those 20-24, while in Qaliubia the peak rate is among those 25-29 This almost certainly reflects a later age at marriage in Qaliubia, and a slower pace of family building--that is, longer birth intervals. The marital fertility rates also support these notions. Even the very high marital fertility among 15-19 year old women in Qaliubia suggests that more of the married women in this age group are marrying in their late teens, while many of those in Minia are marrying at younger ages. At all ages between 20 and 44, however, even marital fertility is substantially higher in Minia than in Qaliubia.

Perinatal, neonatal, infant, and other mortality rates for children under 5 years of age are presented in Table 3, below. First, however, an explanation of the perinatal mortality rates shown. As noted above, the formal definition of perinatal mortality for this project is: fetal mortality after 22 weeks gestation plus live births that die during the first 7 days of life, divided by all pregnancies lasting at least 22 weeks In community based studies such as this, it is impossible to determine duration of pregnancy by week. Even the reported months of duration is a somewhat rough measure, since many women are basing this on their own estimate, not on any medical test or examination. Still, we must assume that these estimates are reasonably accurate. Because 22 weeks comes in the middle of the fifth month, we have computed two estimates of perinatal mortality, one including all pregnancies reported to have lasted exactly 5 months or longer, while the other excludes pregnancies exactly 5 months, and includes only pregnancies lasting 6 months or longer.

As expected, all rates (with the notable exception of the perinatal mortality rates) are substantially higher in Minia than those for Qaliubia. The reason that the perinatal rates are higher in Qaliubia is a combination of two factors. Both the rate of fetal mortality (21

Table 3. Births or Population, Deaths and Death. Minia and Qaliubia - 1995-1996

	Age Group	Pregnancies/ Births/ Population	Deaths	Death/ Mortality Rate	DHS-1995 Mortality Rates 1985-95
Minia	Perinatal (5 Months)	600	22	37	Upper Egypt
	Perinatal (6 Months)	596	18	30	
	Neonatal	589	19	32	47
	Post-Neonatal	589	23	39	51
	Infant	589	42	71	98
	1-4	1990	11	6	
	Under 5	2579	53	21	
Qaliubia	Perinatal (5 Months)	382	17	45	Lower Egypt
	Perinatal (6 Months)	380	15	39	
	Neonatal	365	9	25	33
	Post-Neonatal	365	8	22	28
	Infant	365	18	49	61
	1-4	1319	5	4	
	Under 5	1684	23	14	

Qaliubia vs. 18 Minia) and the rate of mortality during the first seven days of life (25 Qaliubia vs 19 Minia) are somewhat higher in Qaliubia than in Minia. On the other hand, neonatal mortality is lower in Qaliubia. The apparent contradiction results from the fact that in Qaliubia there are no deaths during the period 8-28 days, while in Minia there are 6 such deaths The reasons for higher perinatal mortality in Qaliubia will be examined more closely in subsequent reports. The WHO has recently published estimates of perinatal mortality. The National rates for Egypt range between 10 (for 1988 and based on the national registration system and 43 (for the period 1987-92 and based on data from the 1992 DHS survey). While the registration figure is clearly very low (as would be expected), it is hard to assess the figure of 43 based on

the 1992 DHS survey. This is similar to our rates for Qaliubia, but higher than the rates in Minia. However, it is not at all clear from the available documentation what is included in the denominator of this rate. Therefore, beyond whatever other obstacles there are in making a comparison of rates, this problem makes it almost impossible to assess differences

For all other age groups presented--neonatal, post-neonatal, infant[2], 1-4, and under 5--Minia, as expected, has consistently higher mortality. The rates may be a bit high, but generally look quite reasonable. In Minia post-neonatal mortality is higher than the neonatal rate, while in Qaliubia the reverse is true. This is exactly what would be expected. As infant mortality falls, the first deaths to be eliminated are those to older infants who are dying of diseases such as diarrhea, pneumonia, measles related infections, etc. that are relatively easily prevented or treated. Thus, Qaliubia, with its lower overall infant mortality rate of 49 per thousand births, is likely to have relatively low post-neonatal mortality when compared to neonatal. In Minia, infant mortality is still a fairly high 71 per thousand births, and post-neonatal mortality exceeds neonatal mortality.

Mortality at ages 1-4 is fairly low, though it is almost certain that many of these deaths could have been prevented. When we look at causes of death and patterns of treatment we will have a better idea of how easy it will be to reduce these rates further.

Also included in Table 4 are the neonatal, post-neonatal, and infant mortality rates for Upper Egypt and for Lower Egypt, from the 1995 DHS survey. In all cases, these rates are markedly higher than the rates from our study Since we had expected our prospective data collection to yield relatively high rates, we were, for a moment, a bit surprised by this result.

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[2] Note: For Qaliubia there are 9 neonatal deaths, 8 post-neonatal deaths, and 18 infant deaths. The inconsistency results from one death for which there is insufficient information available to determine how long the child lived before death. It is clear from available information that the child died well before 1 year of age, but it is not possible to say whether s/he died before or after 28 days of life.

An explanation, however, is readily available. The DHS results are for the 10 YEAR period preceding the survey in 1995. That is, they include all deaths to infants and young children during the period 1985 through 1995. This was a period of even more dramatic decline in mortality than in fertility. Therefore, it is impossible to compare our rates for a single year at the end of the period in question with the DHS rates

DATA CHECKS

In order for the reader to assess the quality of the data and the validity of the rates presented, we provide the following description of the data collection and checking. All possible checks that we could conceive of doing on these data were carefully carried out and repeated until errors and inconsistencies were either eliminated or explained.

Perhaps the most important check was to follow pregnancies to be certain that an end to the pregnancy was recorded. A number of pregnancies did not have an end recorded in the current status data. In a few cases this apparent error resulted simply from data entry problems. These were easily correct. In some cases, though, pregnancies with no resulting birth were correct. For example, some women left the sample while pregnant and were lost to follow-up. Whatever the end to their pregnancy, it happened outside our sample Others declared that the reported pregnancy had been a mistake. The woman thought she might be pregnant because of missed menstrual periods, or other signs, but upon investigation, declared that, in fact, she had not been pregnant, at all. In all such cases we accepted the woman's stated explanation. And, in any case, virtually all of these events, even had they been real pregnancies that were subsequently misreported as false pregnancies, would have been early fetal mortality that would not have entered into any of the current rates.

In a number of instances, however, this check revealed important errors In a few cases, the end of the pregnancy was simply missed by the interviewer. This was most likely to happen in situations where the woman went to her father's house, or elsewhere outside the sample, to have her birth, and therefore was not present to be interviewed immediately after the time of the birth. By the time the woman was contacted in a later round, the birth may not have been properly recorded because it was relatively far removed in time from the interview. In the case of a surviving live birth, the event would be recorded elsewhere--on the household listing, and a child questionnaire prepared. If, however, the pregnancy ended in a still birth, or if the newborn died shortly after birth, there would be no way of noting this event except by observing and confirming the pregnancy and its outcome with the woman. Thus, this check was especially important in locating events that could figure not only in the birth rates, but in mortality rates as well.

Another approach to checking the data was to be certain that live births were properly recorded in the household listing, and that all live births noted in the listing were also present in the current status data. This approach revealed errors where the event was omitted from the current status data, as noted above. It also revealed some interviewer errors in recording data, or errors in transferring the data from the questionnaires to machine readable form.

As a routine part of the research, all women experiencing a pregnancy termination during the prospective year of research, or in the year preceding the baseline, were interviewed using a "birth questionnaire" that recorded a wide range of information about the prenatal, intranatal, and immediate postnatal periods. These data provided additional checks on the current status data, but were also essential for determining whether some events were within the scope of the prospective year or not. We began by checking that every birth questionnaire for a child born during the prospective year was recorded in the current status data. There

were, of course, some births within the proper time frame not recorded in the current status data because the woman had not been in the sample at the time, as noted above This check was also important for determining whether events recorded in the current status data in the last round should be included in the vital rates or not.

The current status data do not provide a "birth date", but only a time frame within which the event should have occurred. That is, we have no information on the date on which the pregnancy ended, but only that it ended after the date of the previous round, and before the date of the round in which the event was identified. For all events recorded in the current status data in the second through the fourth rounds, we know the event must be included in the rates, since these rounds occurred within a year of the baseline survey. The fifth round, however, took place anywhere from a few days to 2 months after the one year anniversary of the baseline interview. Thus for events recorded in the fifth round it is necessary to have a reported date of the event in order to know if it occurred during the prospective year, or after the year had ended. The "birth questionnaire" provides such a date (as does the "child questionnaire" for children born alive, and surviving at least until the next interview). For pregnancies ending in an abortion, miscarriage, or stillbirth, and even for children born alive, but who die before the interviewer made a visit following the birth, the only birth date available was recorded in the birth questionnaire. Thus this check revealed some events recorded in the current status data that were out of scope according to the date of birth. We carefully evaluated each such case to be certain that it was properly placed, whether in or out of the one-year follow-up period.

There were a few cases of pregnancy terminations in the fifth round that were either fetal mortality or a live birth that didn't survive until the date of interview, and for which we had no birth question. In these cases, we have no date for the event. Each was carefully

reviewed, and interviewers were asked to visit the household to try to obtain information about the date or birth, outcome, and time of death, if applicable, from other family members or a neighbor. In most cases it was possible to get sufficient information to make a decision about the allocation of the event. In a couple of cases, however, we could not get information. These cases were excluded from the rates.

THE DATA SET

The current status data yielded 1151 events. After checking and correcting this file, there were 1207 events that could potentially be a part of the sample. The additional 56 events result from a number of factors, the principal among them being: 1) pregnancies that were incomplete at the fourth round, with the mother absent in the fifth round; and 2) twins. There were 32 women who were reported to be pregnant in the 4th round, but were absent at the time of the fifth round. All of these pregnancies were investigated. Of them, 8 events were found to have occurred within the prospective year, the remaining 24 were out of scope. The second large category of added events was twins. Sixteen events that involved the birth of twins were recorded in the current status data. Obviously, in these current status data, twins appear as a single event. But from the point of view of vital rates there are two births. Therefore, it was necessary to add a birth for each of events. The remaining 8 were a variety of unreported events. Some were pregnancies that ended early in the study, but where no event, was recorded by the interviewer. One or two were events that only turned up when the interviewer went to ask the mother about a recorded event. And another one or two were exceptional cases that were recorded somewhere in the data, but not in the current status data.

Included in these 1207 records were a number of events that were out of scope. Therefore, two variables were added to the file to indicate whether the particular event should

be included in the 12 month prospective period or not. All events recorded in rounds 2 through 4 were included according to both variables, because we know that these rounds were completed within the prospective year. (No events were recorded in round 1. This first round simply provides the background from which we begin to record events.) As noted above, data collection for round 5 took place anywhere from a few days to about 2 months after the 1 year anniversary of the first round interview. Therefore, we used the date of the pregnancy termination for all events recorded in round 5 to assess whether they were in scope or not.

There are two possible, relatively independent dates of birth in this work. The two sources are the "child questionnaire" from the routine quarterly visits, and the birth questionnaire. In more than 70 percent of the cases, both these dates are available (see Table 4.) While the mother of the child was the respondent for both questionnaires, there was generally a gap of at least 2-3 months after completing the child questionnaire before the birth questionnaire was done. In deciding whether cases should be included in the prospective year or not we used two different inclusion rules. The first was more lenient, requiring that either of the two dates available be within the prospective year. The second, more rigorous, rule specified that BOTH dates must be within the prospective year. The more inclusive rule permitted 35 more events than the second, more exclusive, rule.

For 22 percent of cases--a total of 261 events (104 with a valid date in the child questionnaire, but no date in the birth questionnaire, plus 157 with a valid date in the birth questionnaire, but no date in the child questionnaire[3])--there is just one date of birth available. If the available date was within the prospective year, it was included according to the first,

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[3] Almost all of these cases are either stillbirths, or live births that were born and died between rounds. There are, however, 13 live births for whom either no date of birth was recorded on the child questionnaire (3) or for whom the birth date was so incomplete (year only--no month or day) that it could not be used for the purposes of placing the child in or out of the prospective year (10).

inclusive rule. Sixty-five events fit this criterion. Of course, none of them could satisfy the requirement that both dates be available, thus all of these events are excluded according to the second rule.

Table 4. Sources of Date of Birth for All Events Recorded in the Current Status Data.

		Date Recorded - Birth Questionnaire		
		Yes	No	Total
Date Recorded -	Yes	876	104	980
Child Questionnaire	No	157	70	227
	Total	1033	174	1207

For 70 events there was no date recorded. These were mostly stillbirths, for which it was not possible to do a birth questionnaire. Of these 70 events, 39 occurred in rounds 2 through 4, and were therefore included in both inclusion variables. The remaining 31 events occurred in round 5. Of these, one was included by the less restrictive criterion because, even though the mother was not available to be interviewed and there was no date of birth, other family members provided sufficient information to allow us to determine that the child was born during the prospective year. This child was not included by the more rigorous criterion.

We have calculated the birth rates using both inclusion criteria. However, the rates above are based on the first, more lenient criterion. This seems to be the most reasonable approach, since to exclude all births that have just one date eliminates a number of early deaths for which there was no chance whatsoever of completing a child questionnaire. Therefore, all the tables presented above are based on 1054 events from the (corrected) current status data that ended during the prospective year following the baseline survey.

For usual birth and death rates we need know only whether a pregnancy ended in a live birth or not. If a live birth, the event figures in the computation of rates, otherwise not. For perinatal mortality rates, however, we must know both the duration and the outcome of all

pregnancies. These data are available from the birth questionnaire. For 98 cases, however, the duration of the pregnancy is unknown--in one case, the woman did not know the duration, while in the remaining 97 cases the birth questionnaire was not completed. (See Table 1, above.) For the 80 cases ending in a live birth, the duration is not of great importance. We can safely assume that these events must have lasted long enough to count as total pregnancies and enter into the denominator for perinatal mortality. And while we would like to know if these events were born prematurely, it is unlikely that the missing data, if known, would affect, in any meaningful way, the distribution of the 956 events for which the duration is reported. The remaining 17 cases that resulted in fetal mortality are a greater problem. If these events lasted longer than 5 months they would figure in both the numerator and denominator of the perinatal mortality rate. If they lasted 4 months or less, they would be excluded.

We have no data available reporting the actual duration of these pregnancies. By checking the duration of pregnancy in the current status data, however, we can estimate the length of most of these events. Of the 17 events, we can say, with considerable confidence, that 9 were of short duration, while 3 had lasted 5 months or more. The remaining 5 are ambiguous, though are most likely to have been short, and have been excluded from the estimate of perinatal mortality.

CONCLUSION

In the immediate future we will be continuing to examine these rates, and the birth and death questionnaires that provide additional information about the actions taken during pregnancy and fatal illnesses.

Perinatal/Neonatal Mortality and Morbidity Study

Results of the Quantitative Component

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Many thanks to Dr. Reggie Gibson, Dr. Ayman El Mohandes, Dr. Bonita Stanton, Dr. Ali Abdel Magid, the staff of MotherCare, and the staff of the Social Research Center at the American University in Cairo for their contributions and support. Funding was provided through the MotherCare Project by the United States Agency for International Development.

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Introduction

The following report summarizes results from the community-based component of the Perinatal/Neonatal Morbidity and Mortality Study of the Healthy Mother, Healthy Child Project in Egypt. Results are presented for Minia and Qaliubia, and data for this report come from the maternal symptoms checklists and the treatment history matrices[1]. Results summarize data collected on 183 pregnant women in the longitudinal study samples in Minia and Qaliubia Governorates.

The respondents were originally identified in 1995 as part of The Two Governorate Linkages Survey – a longitudinal study designed to collect data on morbidity and mortality of children under five years of age. This sample of pregnant women was drawn from the original sample of approximately 3000 households in 38 villages in Minia and 3000 households in approximately 50 villages in Qaliubia. Given the abundance of socio-deomographic data already available for these respondents, the Healthy Mother, Health Child Project decided to pre-test and to field the instruments designed for the Perinatal Morbidity Study in these two governorates prior to their introduction in Luxor and Aswan. While the unfortunate incident in Luxor City impeded the conduct of work in Luxor and Aswan, the project was fortunate to be able to collect ample data for analysis in Minia and Qaliubia.

This report is based on the quantitative and quantitative data collected; however, the report is designed to complement a previous report based on the qualitative data only. In fact, the instruments were administered to the same sample of respondents. Therefore, the results presented in both reports are best read in tandem.

This report focuses on four substantive areas respondent's daily activities during pregnancy relative to before pregnancy, preventive health practices of pregnant women, behaviors of other household members that may affect the health of the pregnant woman, respondent's use of health facilities by type during the pregnancy

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[1] See Yount, K.M., Mechael, P., and Langsten, R. (1998). Treatment Histories of Reported Neonatal and Maternal Illness: A Mixed Methods Approach – Manual for Fieldwork. Draft Working Paper Prepared for MotherCare with support from The United States Agency for International Development. This working paper describes the methodology employed for the community-based component and contains translations of the qualitative and quantitative instruments fielded.

period observed, reported symptoms, and familial discussions regarding maternal symptoms and treatment during the week before interview. Concerning use of health services, the investigators were particularly interested in the following topics:

- Combination of services used by the study population
- The demographic characteristics of different groups of clients
- The timing of first visit to different types of health facilities
- The total number of visits made by the time of interview
- Reasons for choosing a particular type of facility or provider.

Results are not disaggregated by month of pregnancy at the time of interview, so the inclusion of women in their sixth month or earlier of pregnancy may bias results downward.

These results are preliminary, but it is unlikely that the broad conclusions reached will be changed in the final analysis.

1. Routine Activities

Figures 1.1 through 1.5 describe the routine activities and preventive health practices of respondents as well as potentially harmful health practices of other household members. Figures 1.1 and 1.2 describe the routine activities of respondents before and during pregnancy. Figures 1.3 and 1.4 show ever and recent vitamin intake during pregnancy among respondents by governorate. Figure 1.5 shows the current smoking behaviors of other household members. Respondents were asked to report on their own smoking behavior however, none reported to smoke, so these data are not presented.

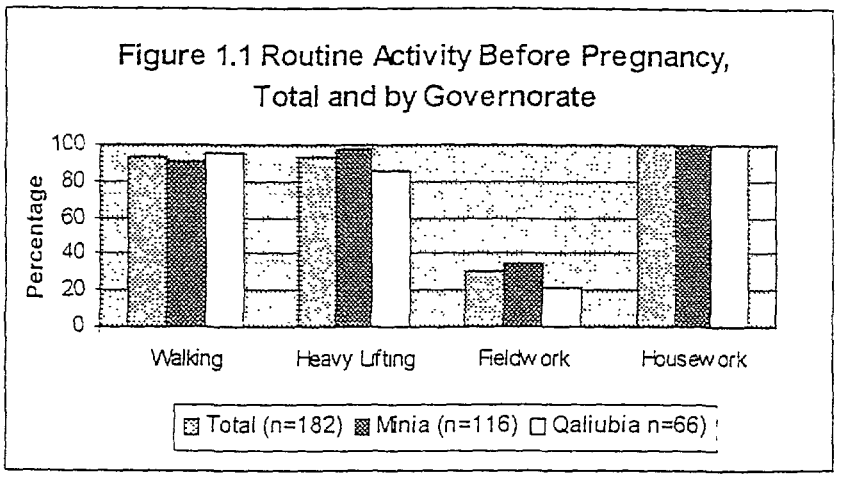
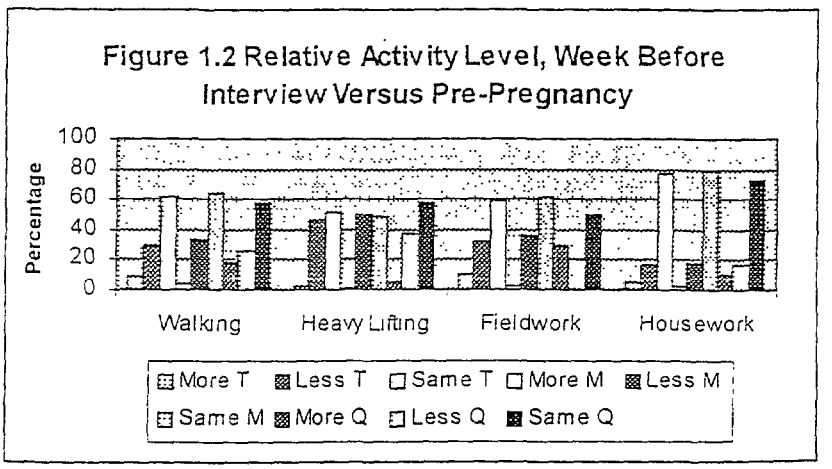


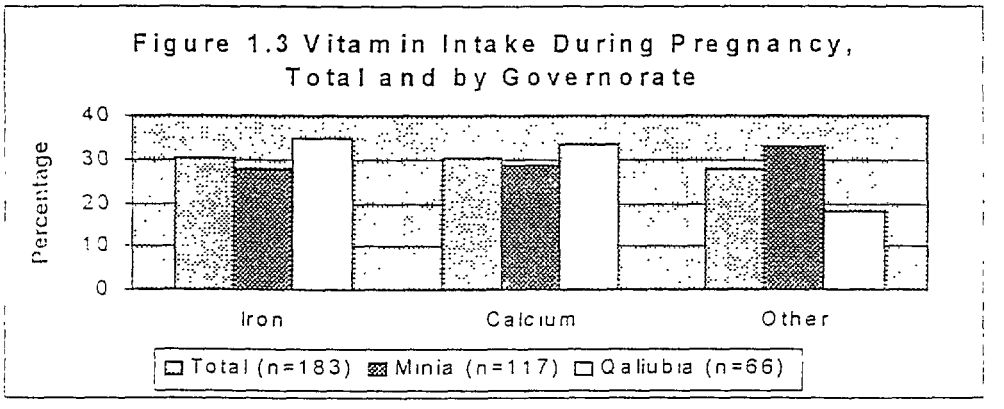
Figure 1 1 shows the activity level of respondents in Minia and Qaliubia prior to pregnancy The vast majority of respondents in both governorates report participating in walking[2], heavy lifting, and housework. Over 30 percent of respondents in Minia also reported being involved in fieldwork prior to pregnancy.

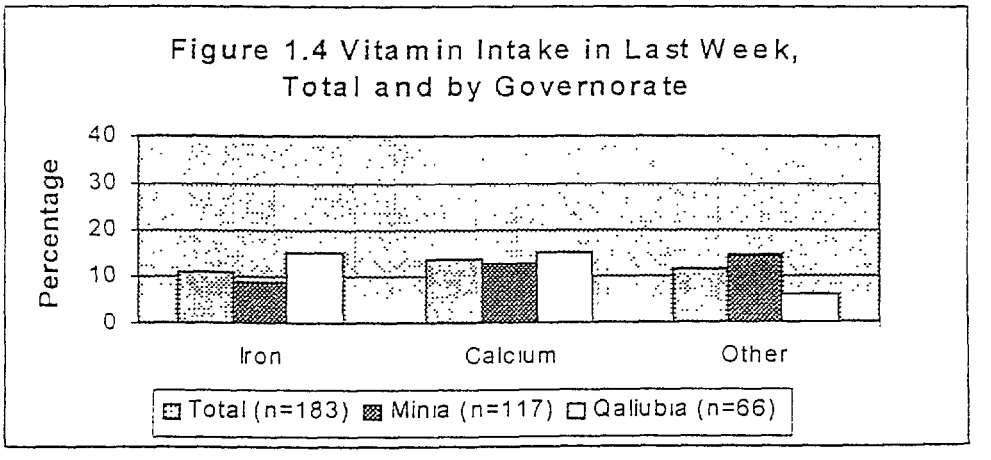


[2] Walking here refers to going out for work, shopping, or for walks.

Figure 1.2 shows that, while a certain proportion of respondents reduce their activity level during pregnancy, the majority of respondents in both governorates continue to participate in the same activities during pregnancy. This result is especially true for housework. Interestingly, a relatively high proportion of respondents in Qaliubia report an increase in activity level for some activities shown (walking and fieldwork) This result may be an artifact of small sample size.

Figures 1.3 and 1.4 show vitamin intake of all respondents and by governorate. About 30 percent of all respondents report taking iron and calcium at some point during their pregnancy. A higher proportion of respondents in Minia than in Qaliubia report also taking some other type of vitamin at some point during pregnancy.





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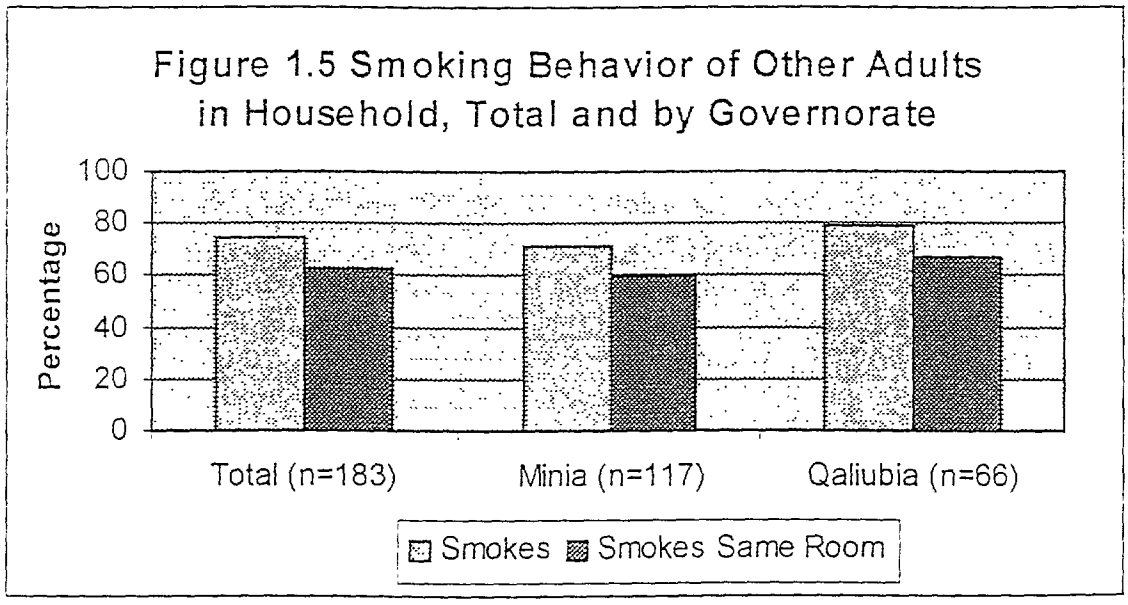
As Figure 1.4 shows, however, supplemental intake levels in the week prior to interview are substantially lower for all types of supplements and for respondents in both governorates.

The maternal symptoms checklist included questions about the health practices of other household members that may affect the health of the pregnant woman. Specifically, the instrument includes questions about the smoking practices of respondents as well as the smoking behavior of other adults in the household. While very few respondents reported that they ever smoked, a high proportion of respondents reported that members of their household currently smoke (Figure 1 5) Over 70 percent of respondents in both governorates report that an adult member of the household currently smokes, and over 60 percent of adult members of the household smoke in the same room as the respondent. Proportions are slightly higher in Qaliubia, a more urban region than Minia. These data provide some indication of the additional exposures of pregnant women in these regions.



2. Choice of Providers During Pregnancy

The maternal symptoms checklist includes detailed questions about visits to providers during pregnancy. Figure 2.1 shows the proportion of all pregnant women and women by governorate that had accessed services at some point during their pregnancy by the time of interview. Among all pregnant women, about 14 percent had not visited any type of facility during that period.

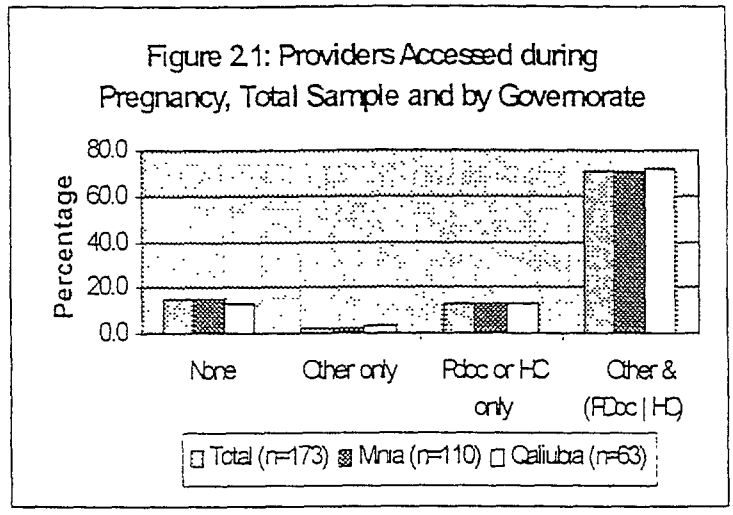
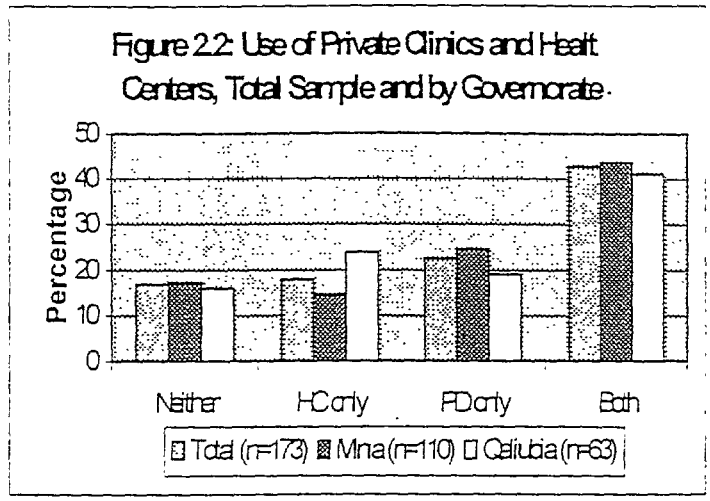


Figure 2.1 also shows that in Qaliubia and Minia alike, it is rare for women to visit "other" providers without also going to a public health facility or a private clinic. "Other providers" includes pharmacists, nurse midwives, private nurses, traditional birth attendants, or health barbers. Only about 2 percent of women report having gone only to these practitioners during their pregnancy. Rather, the vast majority of pregnant women in both areas visit these other providers in conjunction with at least one visit to a public health facility or a private clinic.

Public health centers and private clinics are the services most commonly accessed by pregnant women in both governorates. Figure 2.2 shows the distribution of users of public facilities and private providers for all respondents in the sample and for those in Minia and Qaliubia separately In Figure 2.2, the group "neither" refers to the first two categories shown in Figure 2.1 - those women who did not visit any type of service during their pregnancy and those who use only "other" types of services during their pregnancy to the time of interview. The third and fourth categories in Figure 2.1 are disaggregated in Figure 2.2 into the following groups: using public health facilities only, those visiting private doctors only, and those visiting both types of services during their pregnancy.

About 43 percent of pregnant women reported visiting both public health facilities and private doctors at some point during the pregnancy to the time of interview. About 17 percent of pregnant women in both governorates visit neither type of facility. Interestingly, a slightly higher proportion of respondents in Qaliubia, the governorate that is better off socio-economically, reported having gone to a health center and not a private doctor during their pregnancy. Since sample size is small, however, this difference is not statistically significant. Therefore, a large proportion of pregnant women visit both private providers and public health facilities during pregnancy.



3. Demographic Profile of Client Groups

It is useful to have some idea of the characteristics of the different groups of clients. Since this sample of respondents was selected from a sample that had already been identified and interviewed as part of the Child Survival Project, abundant data are available on their background characteristics and those of their households. Data available include household wealth, educational attainment, work experience, and marital and reproductive history. Table 1 shows the socio-economic backgrounds of

A Woman's Experiences at a Private Doctor in Qaliubia

- Accompanied By: Mother
- Transportation: On foot (ten minutes away)
- Payment for Services: 36 pounds
- Cost of Medication: Doesn't Know, husband paid

Reasons for selecting this provider: They told me that she was good. (Who told you?) My sister had gone to the physician once before and advised me to go to her clinic. When I felt tired, I went to her clinic. She treated me and I thought she was good. I mean that she examined me well, measured my blood pressure, she listened and talked with every woman. She spent a lot of time with every woman and she didn't care about the time. She lets the woman speak, as she likes.

Experience: [I waited] about 3 hours. [The doctor] examined my back, my chest and my abdomen with the stethoscope. She did a sonar, measured my blood pressure and my temperature. She told me that it was low. I was a little warm. She wanted me to do a complete urine analysis, protein percentage, diabetes and pregnancy analysis. She told me that I was pregnant and that I had nothing else. [She prescribed] drops for blood pressure, vaginal suppository, Betadine disinfectant and calcium vitamin.

ID#: 2.42.2.18.01.99, Age: 21

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the groups of pregnant women presented in Figure 2.2. Not surprisingly, those women who access neither public nor private services are the least educated, with over 69 percent reporting to have had no formal education as compared to only 40 to 54 percent with no formal education in the other client groups. This result suggests that there remains a group with poor access to services despite expansion of the health infrastructure in Egypt.

Also not surprisingly, the group of clients that visit only private doctors are the best educated, the most likely to own two or more assets, and the most likely to have ever worked for a wage. Neither the age or the marital history of the various client groups differ in any appreciable way.

Table 1 also shows that not all clients of public health facilities are of low educational status. In fact, 33 percent of those in group 4, the users of both private and public services, have attained at least a secondary level of education. Therefore, the physicians and other providers that staff public health facilities need to be able to interact with a potentially diverse population of clients.

Table 1: Demographic Characteristics of Clients Groups, Total Sample of Pregnant Women

	Client Group			
	1	2	3	4
	Neither	Public Facility only	Private Doctor only	Public Facility & Private Doctor
	N=29	N=31	N=37	N=72
Assets owned				
0	55.2	48.4	37.8	62.5
1	31.0	35.5	40.5	20.8
2+	13.8	16.1	21.6	16.7
Marital Status				
Cur Mar	100.0	100.0	100.0	98.6
Divorced	0.0	0 0	0.0	1.4
Level of Educ				
None	69.0	48.4	40.5	54.2
Prim-Prep	10.3	32.3	21.6	12.5
Sec+	20.7	19.4	37.8	33.3
Ever Worked				
No	86.2	87.1	78.4	84.7
Yes	13.8	12.9	21.6	15.3
Age Group				
<25	38.5	45.8	42.4	40.7
25-34	53.9	50.0	48.5	47.5
35+	7.7[1]	4.2[2]	9.1[3]	11.9[4]

[1] n=26, [2] n=24, [3] n=33, [4] n=59

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4. Reasons for Inaction

Figure 4.1 summarized the causes for a failure to treat to reported symptoms. Categories summarize reasons spontaneously mentioned by respondents in semi-structured interviews. Figure 4.1 highlights the multiplicity of factors that can impede use of services.

While some respondents that had not accessed services prior to interview had not experienced symptoms, many had in fact experienced symptoms. All respondents who did not seek care for an observed symptom were asked to provide some of the primary reasons for not seeking care. Results in this section are drawn largely from the semi-structured interviews that followed completion of the symptoms checklists and event history.

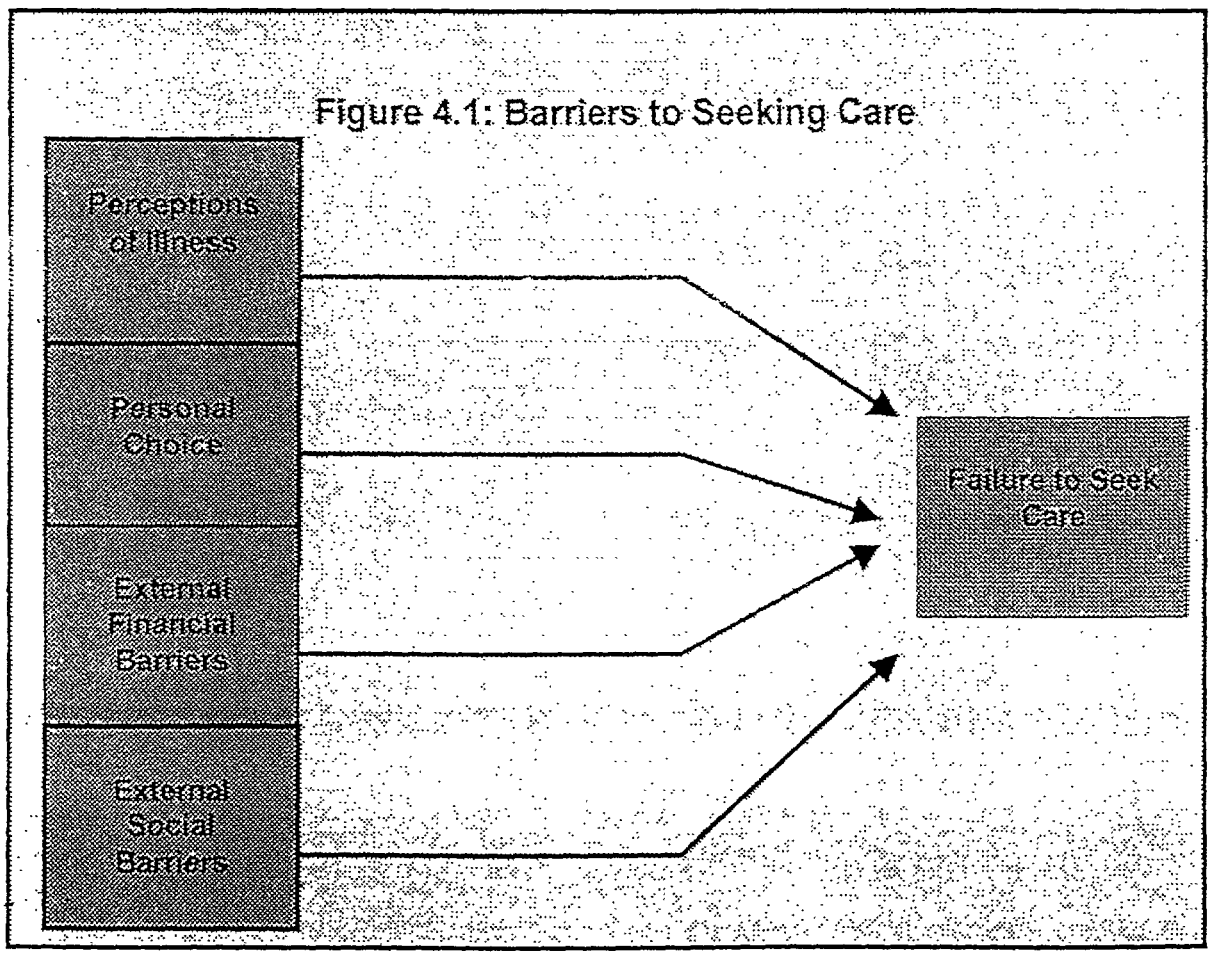

Table 2: Spontaneously-Mentioned Reasons for No Response to Reported Symptoms, All Pregnant Women

Reasons For No Action	Neither[3]	Public Health Facilities Only [4]	Private Doctor Only [5]	Public Health Facilities and Private Doctor[6]
	N=22	N=28	N=36	N=67
No Treatment	77.3	35.0	44.4	34.0
Perceptions of Illness				
Normal	91.0	42.9	58.0	61.2
Go Away	68.2	32.0	36.0	43.0
Mild	41.0	28.5	27.7	31.4
Personal Barriers				
Experience	40.1	14.3	5.6	19.4
Enduring	27.3	10.7	13.9	12.0
Fear Of Medicine	13.7	25.0	27.7	26.9
Woman's own Choice	4.5	14.3	0.0	10.5
External Financial Barriers				
Money	50.0	39.3	8.3	20.9
Time	27.3	3.6	0.0	6.0
External Social Barriers				
Religion	31.9	10.7	8.3	7.5
Family	9.1	3.6	2.7	1.5
Other				
Unwanted Pregnancy	4.5	0.0	0.0	0.0
Don't Know	4.5	10.7	11.0	9.0
Other	50.0	21.4	19.4	35.8

Percentage of women by reason that do nothing for a specific symptom, by client group.

The most commonly mentioned reason for not seeking treatment for a given symptom was that the symptom is considered a normal part of pregnancy (haaga aadeyya). Table 2 provides a summary of the frequency of mention of different reasons for not seeking care. Reasons are organized conceptually.

The first set of reasons concern perception of illness – either than the symptom is normal, will go away in time, or is mild. While missing observations preclude

[3] The total number of women using neither was 49 due to errors in quantitative data files 27 were missing at time of analysis.

[4] The total number of women only using governmental facilities was 32 due to errors in quantitative data files 4 were missing at time of analysis.

[5] The total number of women only using private doctor was 40 due to errors in quantitative data files 3 were missing at time of analysis.

[6] The total number of women using both facilities was 73 due to errors in quantitative data files 6 were missing at time of analysis.

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drawing firm conclusions, the group of pregnant women visiting neither public health facilities or private doctors most often mention these perceptions of illness as a barrier to seeking care. Note from Table 1 than the group visiting neither service is also the most poorly educated, so perceptions that a symptom is "mild" or "normal" may not reflect the actual impact of the symptom on the woman's health.

A Woman's Experiences in a Government Health Facility in Qalioubia

- Accompanied By: Sister-in-law
- Transportation: Microbus
- Payment for Services: 60 piastres
- Cost of Medication: 5 pounds

Reasons for selecting this provider: They have chosen it for me. (Who?) My father-in-law. I wanted to go to a private physician but he refused because of the money. Although they had a lot of money, they took me to the hospital because my father-in-law is a stingy man.

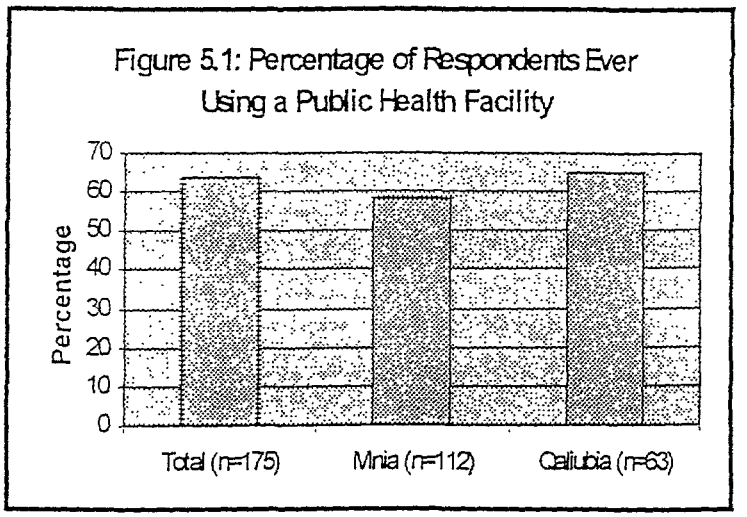
Experience: [I waited] about an hour and half. I told [the doctor] that I had severe irritations. She said: "Don't make love with your husband because of the pregnancy and the irritations." She prescribed a disinfectant to wash up with once a day at night and she advised me to add hot water on it. She also prescribed a suppository.

ID# 2.42.2.18.01.99, Age: 35

In general, the group with the lowest access to services is most likely to mention personal barriers to care, external financial and social barriers to care, and other barriers to care. While caution in interpretation is recommended due to missing observations, it is notable the poor access to services can be caused by a multiplicity of factors, some amenable to public health intervention (knowledge of symptoms and severity), others more amenable to broader socio-economic change (financial barriers), and public health interventions directly toward the family members of pregnant women.

5. Use of Public Health Facilities

With an idea of the combinations of services accessed during pregnancy as well as the socio-demographic profiles of different client groups, it is useful to explore the timing and motivations for visiting different providers. Data presented are derived from both the



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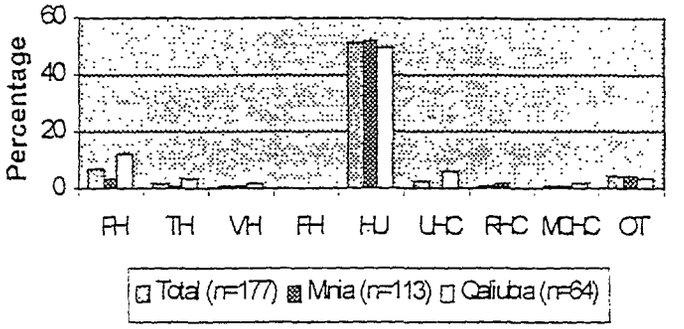
survey instruments and semi-structured interviews. Attention is first given to public health facilities. Figure 5.1 shows ever use of public health centers for the total sample of pregnant women and by governorate.

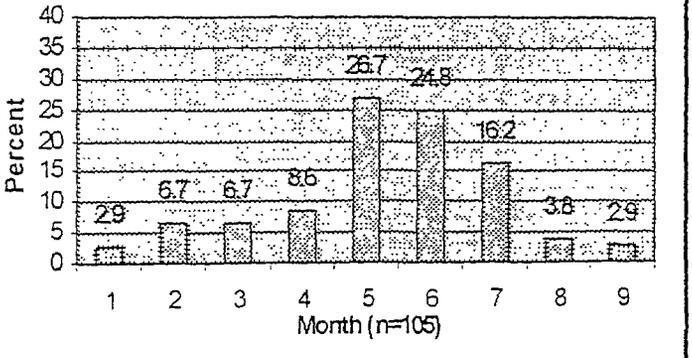
About 61 percent of pregnant women had ever visited a public health facility at some point during their pregnancy to the time of interview. Differences by governorate are not marked. As shown in Figure 5.2, health units are the most frequented among public facilities, with over 50 percent of all pregnant women attending them at least once during the period. All other types of public facilities are not commonly visited in either governorate, except for public hospitals. About 12 percent of pregnant women in Qaliubia report having visited a public hospital compared to only 3.5 percent of respondents in Minia.

Figure 5.2: Percentage Ever Visiting a Public Health Facility During Pregnancy, by Type of Facility



The timing of first visit and the number of visits made to public health facilities suggest the major reason for use of these services. Figure 5.3 shows the distribution of the timing of first visit for all pregnant women. The distribution does not differ substantially for women in Minia and Qaliubia, so only overall results are shown.

Figure 5.3: Timing of First Visit to a Public Facility During Pregnancy



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A low proportion of women report making a visit to a public facility early in their pregnancy. Rather, 27 percent and 25 percent of pregnant women first attend during their fifth or sixth month, respectively.

A Woman's Experiences in a Government Health Facility in Minia

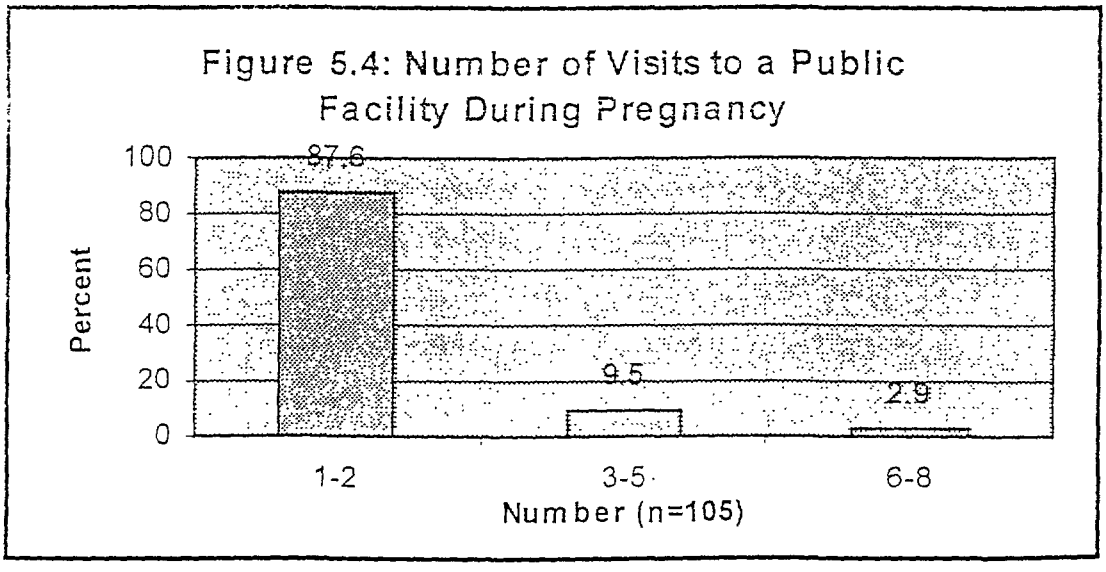
- Accompanied By: Husband
- Transportation: Minibus (2 hours)
- Payment for Services: N/A
- Cost of Medication: N/A

Reasons for selecting this provider: Because the entire village goes to him and I have always felt better on his treatments. Whenever I see him he examines me and his treatments produce results at once.

Experience: [I waited about]15 minutes until it was my turn. The doctor examined with the stethoscope and he measured my blood pressure. He asked me whether I had previously had high blood pressure. I told him that I did not know, but he did not tell me whether my blood pressure was low or high. He told me to take the vitamins that he prescribed at the time until delivery and if I ran out of them that I should buy more and so on until the delivery.

ID# 1.27.1.37.01.01, Age: 26

About 88 percent of pregnant women using public health facilities make 1 to 2 visits by the time of interview (Figure 5.4). In Minia, the mean number of visits is slightly lower than that in Qaliubia, but differences are not significant: 1.09 (95% CI 1.01-1.18) versus 1.25 (95% CI 1.08-1 42).



Both the timing of first visit and the number of visits strongly suggest that women use public health facilities for tetanus toxoid immunization. When asked to confirm the reasons for visiting a public health facility, over 85 percent of respondents stated that the purpose of the visit was to receive the immunization (Table 3).

Table 3: Reasons for Visiting a Public Health Facility During Pregnancy, by Governorate

	Total	Minia	Qaliubia	Fisher's Exact P[1]
	N=104	N=64	N=40	
Health Problem	23.1	18.5	30.0	NS
Routine visit	13.5	06.3	25.0	.. 0.015
Tetanus Toxoid Im	84.6	87.7	80.0	NS
Other	4.8	07.8	00.0	NS

[1]Difference in proportion of respondents in Minia and Qaliubia mentioning a given reason for visiting a public health facility.

The second most commonly mentioned reason for attending a public health facility among respondents in both governorates was a health problem, with about 23 percent of all pregnant women attending public health facilities stating that a health problem motivated the visit. Interestingly, respondents in Qaliubia more often mentioned that routine care was a reason for visiting a public health facility (Fisher's exact p=0.015).

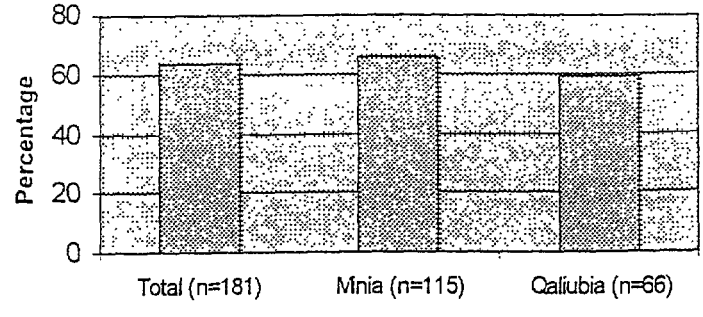
Generally, the perception is common that the quality of public health services is poor This perception explains in part the relative under-utilization of public health facilities for treatment of problems or for routine visits.

> What did you like about the health center?
> Nothing. I took the injection and left immediately.
>
> Respondent from Qaliubia

6. Visits to Private Doctors

Both the timing of visits and the number of visits made to private doctors differ from the timing and number of visits made to public health facilities. Figures 6.1 through 6.3 and Table 4 illustrate the differences.

Figure 6.1: Percentage of Respondents Ever Visiting a Private Doctor During Pregnancy



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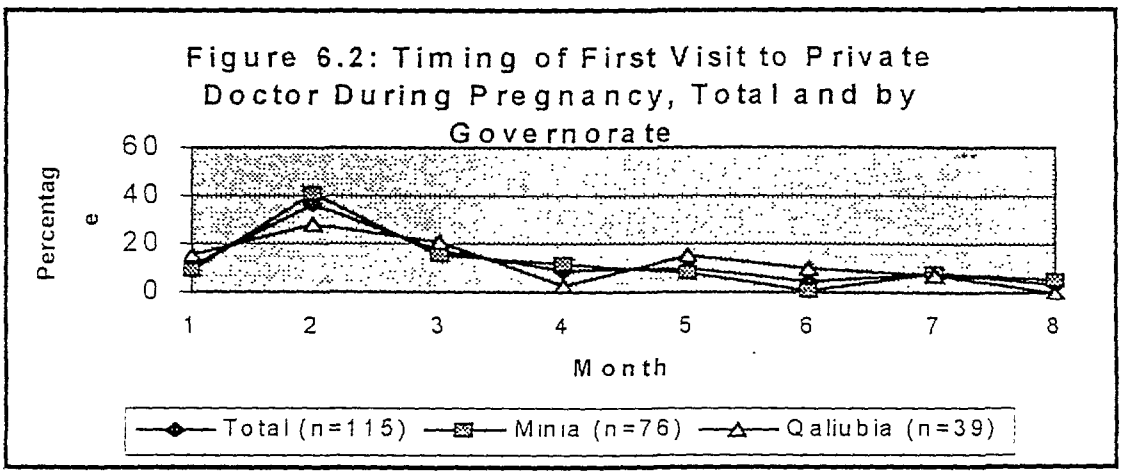


About 64 percent of pregnant women in Minia and Qaliubia ever visit a private doctor during their pregnancy (Figure 6.1). Almost 37 percent of all those visiting private doctors first go during their second month of pregnancy. As shown in Figure 6.2, women in Qaliubia tend to make their first visit the private doctor slightly earlier than women in Minia; however, the total proportion of respondents visiting in the first two months of pregnancy is higher in Minia.

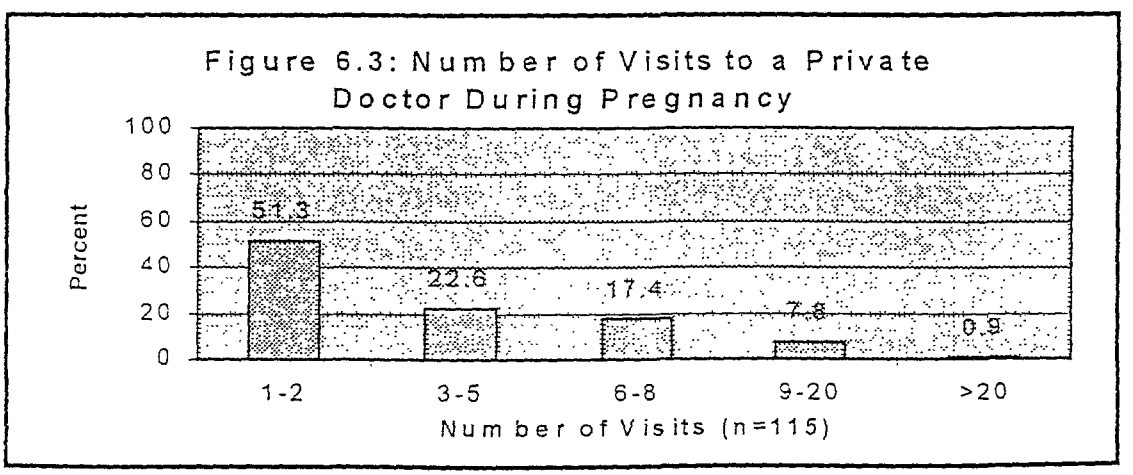


Figure 6.3 shows the number of visits made to private doctors by the time of interview among those ever going to private doctors. While over half of respondents report going only one or two times, about 40 percent of women report going between

three and eight times during the period of observation. Referring back to Figure 4.5, this distribution differs markedly from the distribution of reasons for visits to public health facilities. Only a small proportion of women at public health facilities go more than one or two times; whereas, a large proportion of respondents visiting private doctors make multiple visits.

A Woman's Experiences at a Private Doctor in Minia

- Accompanied By: Husband
- Transportation: Rented Car
- Payment for Services: Does not know; Husband paid
- Cost of Medication: N/A

Reason for selecting this health care provider: Because he is a clever doctor and I am used to going to him since my first pregnancy. And I am going to him continuously.

(If you didn't go to him where would you go?) I wouldn't go to any place else. I went to the health center once when I was pregnant in the 6th month but the nurse said that there was no vaccination but I didn't go to be examined because they do nothing and their examination is bad and they gave no medication. But he is good and clever.

Experience: My back was hurting me and two drops of blood came down on me, so I was afraid because I knew that I was pregnant. When my turn came, I entered with my husband. The doctor examined me with sonar and with the stethoscope. He said: "Don't be afraid the baby moved," and he advised me to sleep on my back for two days and he prescribed vitamins and capsules. I waited at the doctor's clinic and my husband went to the pharmacy and brought the medicine. He came back and showed the medicine to the doctor and went back home. [I took the medicine] and I felt better. [I was re-examined] after 7 days.

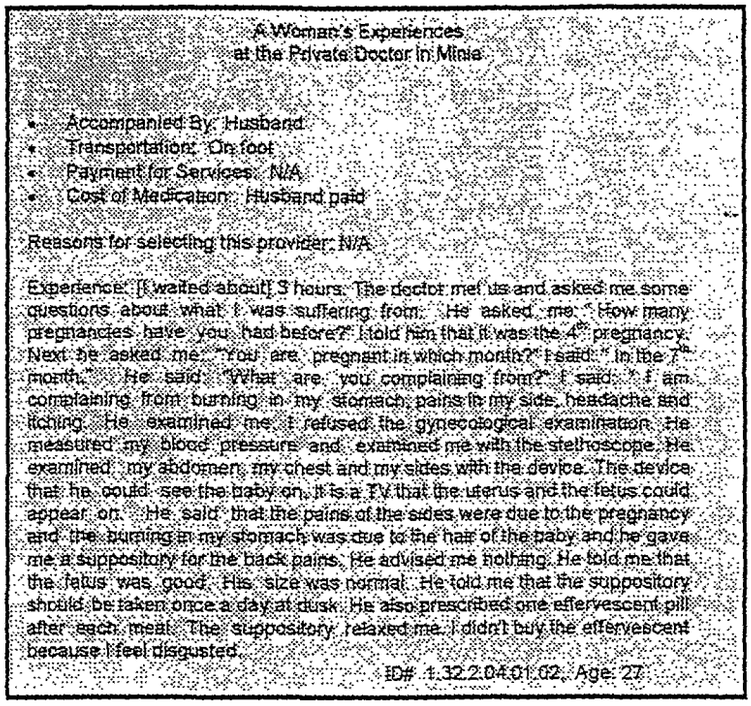
ID#: 1.26.2.32.01.05, Age: 21

Both the differences in timing of first visit and number of visits suggest that reasons for visiting private doctors differ from those for going to public facilities. As shown in Table 4, the major reasons for visiting private doctors are in fact treatment of problems (86 percent) and routine examinations (29 percent). Women rarely see a private doctor for TT immunization or for other reasons. Table 4 also shows the distribution of reasons for visits to private doctors for all pregnant women and by governorate. Unlike the results for public health facilities, the distributions by governorate are do not differ.

Table 4: Reasons for Visiting a Private Provider During Pregnancy, by Governorate

	Total	Minia	Qaliubia	Fisher's Exact P[1]
	N=115	N=76	N=39	
Problem	86.1	86.8	84.6	NS
Routine visit	28.7	25.0	35.9	NS
TT Immunization	00.9	00.0	02.6	NS
Other	04.4	06.6	00.0	NS

[1]Difference in proportion of respondents in Minia and Qaliubia mentioning a given reason for visiting a public health facility.



A Woman's Experiences
at the Private Doctor in Minia

- Accompanied By: Husband
- Transportation: On foot
- Payment for Services: N/A
- Cost of Medication: Husband paid

Reasons for selecting this provider: N/A

Experience: [I waited about] 3 hours. The doctor met us and asked me some questions about what I was suffering from. He asked me: "How many pregnancies have you had before?" I told him that it was the 4th pregnancy. Next he asked me: "You are pregnant in which month?" I said: "In the 7th month." He said: "What are you complaining from?" I said: "I am complaining from burning in my stomach, pains in my side, headache and itching. He examined me. I refused the gynecological examination. He measured my blood pressure and examined me with the stethoscope. He examined my abdomen, my chest and my sides with the device. The device that he could see the baby on, it is a TV that the uterus and the fetus could appear on. He said that the pains of the sides were due to the pregnancy and the burning in my stomach was due to the hair of the baby and he gave me a suppository for the back pains. He advised me nothing. He told me that the fetus was good. His size was normal. He told me that the suppository should be taken once a day at dusk. He also prescribed one effervescent pill after each meal. The suppository relaxed me. I didn't buy the effervescent because I feel disgusted.

ID# 1.32.2.04.01.02, Age: 27

See the report of the qualitative data for more detailed reasons for choosing private doctors or a public facility. Generally speaking, however, the reasons are succinctly summarized by a respondent from Minia.

Summary and Recommendations

> I went to the health center to take the vaccination, but I do not go there for anything else...it is better to go to the private doctor when I feel sick and I have the money.
> Respondent from Minia

The quote from this respondent in Minia summarizes well the successes and challenges to provide accessible, high quality services to improve the health of pregnant women and their newborns in Egypt. Generally, a high proportion of pregnant women have access to either public health facilities or private providers during their pregnancy. The public health sector seems to have had success in administering tetanus toxoid immunization in the general population; however, women report having to visit health centers multiple times to receive the immunization due to shortages in supply.

Generally, pregnant women prefer when possible to use the private sector early in their pregnancy for identification or confirmation of pregnancy and for the treatment of early symptoms. Women continue to access private care for the treatment of problems during the course of their pregnancies, and often they are accompanied by another adult. Training of private physicians to inform family members about healthful practices at home, such as refraining from smoking, would help to improve the overall environment of the pregnant woman. Also, the public health sector will need to improve the overall quality of services to attract women at earlier and later stages in their pregnancies. Key areas of improvement would be the conduct of full exams, the regular availability of supplies, and the provision of appropriate information about healthful, preventive, and curative practices that the woman can practice during pregnancy.

Despite the expansion of maternal and child health services, there remains a portion of the population that does not utilize either public or private services during pregnancy. These women tend to have the lowest educational attainment compared to other client groups. Stated reasons for inaction among this group suggest that both "internal" perceptions and "external" barriers impede use of services. The most commonly mentioned reason for inaction is the perception that symptoms of pregnancy are normal. While women might correctly perceive certain symptoms to

be a normal part of pregnancy, much information about what is and is not normal is based on word of mouth and personal experience. A fruitful undertaking might be the training of physicians to deliver key messages about danger signs during pregnancy. Another fruitful undertaking might involve informing family members about the signs and symptoms of pregnancy that merit intervention.

A Situational Analysis of Perinatal Mortality in Egypt

Bonita Stanton, 1997

Introduction

The Global Situation

Perinatal and neonatal health reflect the health of the mother and the quality of care during her pregnancy. Perinatal health affects the health of the infant for the remainder of his or her life. With the increased attention by global policy-makers worldwide on healthy mothers and children, this critical period in our lives has become a main focus of health professionals around the world.

Perinatal mortality (deaths occurring after the 22 week of gestation through the end of the first week after birth) and *neonatal mortality* (deaths occurring during the first 28 days after birth) account for approximately one-third of all deaths occurring during the first year after birth. (WHO 1996)

The global perinatal death rate has been estimated at 53 per 1000 births, ranging from 9 in North America to 88 in Western Africa. The rate in Northern Africa has been estimated to be 43. Worldwide, stillbirths account for approximately one-third of all infant mortality and early neonatal deaths account for an additional quarter of infant deaths. (Espeut, Unpub)

The most frequent causes of perinatal death are infection of the amniotic fluid, congenital syphilis, abruptio placentae, fetal hypoxia, compression of the umbilical cord, trauma, and congenital malformations (Walsh 1993). The two most significant factors affecting mortality during the perinatal and neonatal periods are gestational age and birth weight (Berendes 1993), with evidence that birth weight is the more important determinant (McCormick 1985). Infants with birth weights of less than 2500 grams or over 4000 grams experience dramatic increases in early mortality. These conditions in turn are caused by a variety of intervenable and nonintervenable factors. In addition, many other environmental, maternal, and fetal/infant factors directly impact on perinatal and neonatal mortality rates.

Using fresh condition of the stillborn (as opposed to a macerated fetus) as a proxy for potentially preventable deaths, it has been estimated that nearly 40% of stillbirths are preventable through good obstetric care. (Walsh 1993) Numerous interventions have been undertaken globally to improve birth outcomes for both the mother and child in developing countries. Depending on the development status of the country and existing infrastructure, these interventions have generally focussed on the community-based system for home delivery (e.g., training of traditional birth attendants) and/or the development of a tiered, referral system. (Espeut, unpub; Walsh 1993) Although few of the studies have employed a randomized controlled design and the descriptions of the interventions are frequently vague, nevertheless the literature does suggest that interventions can

make a difference. Studies have found decreases in neonatal tetanus where previous immunization rates were low, and some decreases in birth injury and respiratory distress syndrome (Rahman 1982). Some studies have noted a decrease in intrauterine growth retardation (Coria-Soto 1996) and others apparently resulted in impressive decreases in perinatal mortality (Ward 1995; Wilkinson 1991; Ibrahim 1992). The literature seems clear that early identification of three maternal conditions (syphilis, hypertension, and diabetes) can significantly reduce adverse perinatal outcomes. (Costello 1993

Analysis of the Egyptian Situation

Clearly, much is known about perinatal and neonatal mortality worldwide. Rates have been estimated, direct and indirect causative factors have been identified, and intervention approaches have been developed. We know that perinatal and neonatal mortality and morbidity are substantial contributors to childhood mortality and morbidity and in many cases adverse outcomes could be prevented. However, transferring this general global knowledge to an action level at each country requires a detailed, specific knowledge of the situation of that country or region. Egypt is ready to embark on a concerted effort to improve perinatal and neonatal health. It is therefore the purpose of this paper to review what is known about these issues in Egypt at the present time and to contextualize these findings with other countries where appropriate.

Perinatal Mortality Rate in Egypt

Time trends with regard to perinatal and neonatal mortality rate

In general mortality rates in the perinatal and early infancy period are slower to respond to improvements in general socioeconomic level and health care system than mortality in later childhood. (Espeut, unpub) Data regarding perinatal deaths is not available for Egypt, but data regarding neonatal and post-neonatal mortality rates in Egypt confirms this general global trend, as shown in Table 1.

Table 1
Neonatal, infant, and under-fives mortality
by years preceding 1995 DHS

Years Preceding Survey	Neonatal	Infant	Under-5
0-4	30.4	62.6	80.6
5-9	43.5	82.3	110
10-14	45.4	96.6	138.5
15-19	53.5	116.6	189.8
20-24	62.6	138.0	236.0

Source: DHS 1996

Appreciable declines have occurred at all ages. However, while the under-fives mortality is one-third of what it was 20 years ago, infant and neonatal mortality have only been reduced by one-half (DHS 1996). Indeed, the most impressive decline has been in child mortality; while 113 per 1000 children aged 1 through 5 years died twenty years ago, only 19 out of 1000 Egyptian children within this age range are currently dying. In summary, as has been seen in other developing countries undergoing transition, neonatal mortality is responsible for an increasing percentage of childhood mortality (e.g., neonatal mortality contributed 27% of all under-fives deaths 20 years ago but is now responsible for 37% of all under-fives deaths.) Were data available regarding perinatal deaths, it is likely that these changes in proportion of mortality would be even more dramatic.

Two caveats regarding neonatal deaths are important to underscore. First, while data is scant regrading the age distribution of neonatal deaths, existing data from a prospective study conducted among 10,000 households in Menoufia in 1990-91 suggests that a high proportion of these deaths occur in the *early* neonatal period. Indeed in this study all 17 neonatal deaths occurred during the first 15 days of life, with 15 of them occurring within the first week of life (e.g., the end of the perinatal period). Clearly good obstetric care and early neonatal care will be essential to impact on these early neonatal deaths.

Second, in many developing countries, available data underestimates actual mortality rates, especially those in the neonatal period. (Lumbiganon 1990) We suspect that even the high figures cited in the preceding paragraphs represent a substantial under-reporting of actual rates, particularly of early neonatal deaths. Becker et al(1996) have estimated that only 64% of under-fives deaths are notified. In fact, only 35% of neonatal deaths were notified, compared to 90% of deaths above one year of age. Thus, figures based on national vital statistics represent a gross underestimation of the problem. The authors also examined rates obtained in national surveys such as the United Nations PAPCHILD of 1990-91 and the Egyptian Demographic and Health Survey of 1992. The rates obtained from these two surveys were also about 20% lower than what the authors have estimated are the true figures for under-fives mortality, with the largest discrepancies being found among the younger age groups. In summary, the current neonatal mortality rates discussed above are likely to be a gross under-representation of the current state.

Factors influencing rates: Location

Within many countries there is an urban/rural gradient with respect to childhood mortality, with rural areas generally faring worse than urban areas. (Roemer 1990) Likewise, mortality rates frequently differ by region within a country, particularly where there is substantial variation in geographic, political, ethnic, and/or economic conditions by region.

As seen in Table 2, "location" of the mother greatly influences mortality rates in Egypt.

Table 2
Differences in neonatal, infant and under-fives mortality rates by location

	Neonatal	Infant	Under-fives
Urban	29.4	51.1	64.5
Rural	42.3	86.8	116.0
Urban Governances	23.8	42.9	56.9
Lower Egypt	33.2	60.9	79.8
Upper Egypt	47.2	97.7	129.2
Frontier Governances	24.5	53.8	63.0

Source: DHS 1996

While the neonatal urban/rural difference in mortality is not as pronounced as that for infants and under-fives overall, it nonetheless is impressive. Neonatal mortality in Upper Egypt is twice that of the Urban Governances and the Frontier Governances and over 50% greater than that of Lower Egypt. The Urban-Rural gradient is seen within Upper Egypt (41.1 versus 49.3). [It is perhaps worth noting here that Becker found the greatest rates of under-registration of deaths in Upper Egypt and in rural areas (Becker 1996). So, as marked as these discrepancies appear to be if the available data is accepted as it is, actual gradients are probably even more marked.] In summary, there are marked geographic differences in neonatal mortality rates in Egypt, with the rural areas in Upper Egypt experiencing the highest rates. (DHS 1996)

Factors influencing rates: Maternal Education

Wherever it has been examined, there has been a robust inverse correlation between maternal education and infant and childhood mortality. Maternal education appears to exert its influence in its own right and not as a proxy for income. (Cleland 1988)

Indeed in Egypt differentials based on maternal education are striking for neonatal, infant, and under-fives mortality. Neonatal mortality rates among infants born to mothers with no education (44% of the total population) are 46 while those among mother with at least a secondary population (24% of the population) are 20.6. As striking as these differences are, they are even more marked for infant mortality (93.4 versus 32.4 respectively) and for total under-fives mortality (123.4 versus 39.1). (DHS 1996) (Again, in Becker's analyses, under-registration of infant deaths was substantially higher by uneducated women and so the actual gradient on the basis of education is probably even sharper than these data would indicate (Becker 1996).) In summary, poorly educated women constitute a substantial proportion of Egyptian mothers, and poor maternal education is strongly correlated with high neonatal, infant, and under-fives mortality rates.

It is important to note here that Upper Egypt, with more than its share of neonatal mortality, also has lower rates of maternal education than other areas in Egypt. In Upper Egypt 48% of women had no education compared to 33% in Lower Egypt. Likewise, there is

a substantial urban/rural gradient, with 48% of rural women having no education compared to only 21% of urban women. Conversely, one-quarter of female urban dwellers have finished secondary school compared to less than one-tenth or female rural dwellers (DHS 1996) In summary, it is probable that maternal education and location do not operate independently with regard to perinatal and neonatal mortality.

Factors influencing rates: Maternal Antenatal and Delivery Care

Given that perinatal and neonatal health reflect the health status of the mother and the obstetric care received, it is logical that the receipt of antenatal care and attended deliveries should be associated with improved perinatal outcomes. Indeed this association has generally been noted in multiple settings (Chi 1981; Donaldosn 1984; Brown 1985; IOM 1985). The odds ratio for perinatal death among women receiving little or no antenatal care has been estimated to be 2.2 to 4.4 (Espeut, unpub).

The implications of these global findings are important in Egypt. In the 1995 DHS, only 39% of pregnant women received antenatal care and only one-third of women delivered in a health facility. (Rates are even lower in Upper Egypt where only 29% received antenatal care and only 21% delivered in a health facility.) However, in spite of these low rates, Egypt does not differ from other settings in that both antenatal care and delivery care clearly influence neonatal and infant mortality rates. Infants born to mothers with no antenatal or delivery care (about half of all deliveries) experienced a neonatal mortality rate of 31.2 and an infant mortality rate of 74.3. Infants whose mothers received either antenatal or delivery care, mortality rates were 35.2 and 68.7, and for those with both types of care, the rates were 23.8 and 38.6. In summary, prenatal care and delivery care had a strong inverse correlation with birth outcome.

As would be expected, receipt of antenatal care and delivery care were confounded by education. For example, 83% of women with no education delivered at home compared to 40% of women with at least a secondary education. Likewise, receipt of antenatal care and delivery care were also not independent variables. For example, 82% of women with no antenatal care delivered at home compared to only 35% of women with four or more antenatal visits.

The low rates of antenatal care bear some additional discussion. It has been observed that use of traditional birth attendants in Africa is low compared to other settings. (Walsh 1993) Certainly this situation applies to Egypt where fewer than 1% of women received antenatal care from a TBA (DHA 1996). One might expect that given that the few women who do receive antenatal and supervised deliveries receive these services from physicians, such care would be of high quality. While there are not adequate data currently available to assess this questions, preliminary data suggest some problems with the care received. For example, as noted later, receipt of tetanus toxoid by the mother has a dramatic impact on neonatal health. At the same time, receipt of tetanus

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toxoid is not equivalent to receipt of full antenatal care and a good immunization program should seek to identify pregnant women and refer them into antenatal care. But, according to the 1995 DHS, only 28% of women received both antenatal care and Tetanus Toxoid while 13% received care but no tetanus toxoid and 40% received tetanus toxoid and no care. More meaningful process indicators (such as screening for preeclampsia, diabetes, syphilis) are not available. In the "National Maternal Mortality Study" in 47% of deaths there were identified problems with the quality of prenatal and/or obstetric care received (MOH 1994). Needless to say, this does not mean that mistakes are present in 47% of all deliveries as obviously deliveries with poor outcomes may be more likely to have been mishandled. But, these data do provide additional evidence that the quality of care may be problematic as well as access to care.

In spite of these problems, time trend analysis shows considerable improvement in the receipt of antenatal and intrapartum services. Receipt have tetanus toxoid by the mother has increased steadily from 1988 when only 11% of the population received it to 70% in 1995. The proportion of women attended by a physician at the time of delivery likewise increased from 35% to 46% over the same time period. Unfortunately, mother under the age of 20 and grand-multips were still the least likely to have been attended by a physician at delivery and there was a marked urban-rural gradient (with fewer rural deliveries attended by a physician) especially in Upper Egypt. (DHS 1996)

In summary, antenatal care and attended deliveries remain relatively low in Egypt in spite of some recent trends toward improvement. Given the low rates and the strong associations with perinatal outcomes, increasing these rates should be a primary focus of future intervention efforts. There is sparse data regarding the quality of care received, but available data, although indicating some improvement, suggests that there is still considerable improvement to be made. Data regarding more meaningful process indicators must be obtained in future studies.

Factors influencing rates: Additional Demographic Factors

Additional demographic factors influencing neonatal mortality rates in other settings include gender of the child, age of the mother at birth, birth order, previous birth intervals, and size at birth. In Egypt these factors also influence neonatal mortality rates.

Globally, in the perinatal period, males tend to suffer higher mortality rates than females. Subsequently females experience higher rates especially in some parts of Asia. (Stanton 1994) A similar pattern is seen in Egypt. Males are substantially more likely to die in the neonatal period than females (42.6 versus 31.5) while the infant mortality rates are the same, and the under-fives mortality rate is slightly higher for females. In fact, after the neonatal period, females consistently suffer higher mortality rates. (DHS 1996) (It is important to note that contrary to what

one might expect, In summary, males appear to suffer a higher mortality rate in the neonatal period. However, the intervention implications of the male mortality gradient in the neonatal period are unclear.

High (greater than 35 years) and low (less than 20 years) maternal age represent global risk factors for adverse perinatal outcomes. (Walsh 1993) Odds ratios associated with these factors for perinatal death range from 2.1 to 9.5 (Espeut, unpub). Certainly these relationships apply to Egypt. Infants born to mothers less than 20 years of age have higher neonatal mortality rates (53) than infants born to older women (rates are in the 30's depending on the age of the mother). Infant mortality and under-fives mortality follow a similar trend. In 1995, approximately 10% of teenagers had delivered their first child or were pregnant. Rates were higher in Upper Egypt and nearly twice the national average in rural Upper Egypt. (DHS 1996) Beyond the biologic explanations for risk attributed to these demographic factors, as noted above, there are some indications that they are less likely to seek antenatal care and/or have attended deliveries. In summary, given the relatively high prevalence of low maternal age and the magnitude of the odds ratio associated with this risk factor, efforts to increase maternal age could substantially lower the perinatal mortality rate.

Birth order is associated with differentials in mortality. First born neonates and neonates whose mothers have had 4 or more previous births experience higher rates of mortality (Walsh 1993), perhaps 1.6 to 2.1 fold greater than other members of their birth cohort (Espeut, unpub) In Egypt, for neonates, infants and under-fives, the second and third born consistently experience the lowest mortality rates. Neonatal mortality is substantially higher for the seventh (or higher) born, with mortality rates of 50 versus in the 30's for earlier born neonates. Likewise, children with a birth order of 7+ are more likely to experience infant or under-fives deaths than earlier born siblings. Approximately 10% of children in Egypt have a birth order of 7+ while 20% are the first birth (DHS 1996). In summary, available data for Egypt corroborates the health hazards of birth order (first born or high birth order) and underscores the importance of current family planning initiatives.

Birth intervals are inversely related to mortality rates throughout early childhood, especially marked in the neonatal period (Walsh 1993). This condition applies to Egypt as well. Infants born after a birth interval of less than two years (one quarter of all births in Egypt) experience a neonatal mortality rate of 65 compared to infants born with an interval of 2 to 3 years (one half of all births) with a rate of 23 and infants born after an interval of 4 years (one quarter of all births) of 19.6. While there is a weak inverse correlation between birth interval and education the association is not very marked. Urban dwellers are more likely than rural dwellers to have longer birth intervals.

Regional differences are not marked. (DHS 1996) In summary, in Egypt there is evidence that prolonging current birth intervals could substantially lower neonatal mortality rates.

Prior reproductive loss is associated worldwide with increased perinatal mortality (Walsh 1993) with an estimated odds ratio of 2.4 to 5.3. Data regarding prior pregnancy loss is not available for Egypt and perinatal mortality are not available.

As noted in the introduction, low (or high) birth-weight are associated with substantial perinatal morbidity and mortality. Data regarding birth-weight and perinatal outcomes are not available, but there are some data regarding the prevalence of low birth-weight. In a small study conducted in Qalyubria in 1994, the incidence of low birth-weight (<2500 grams) was 15.7%. A high risk factor was a birth interval of less than two years. In a national study conducted the following year in 12 districts of 6 governances, the percent of infants born with a weight of less than 2500 grams ranged from 8 to 17% with an average of 12.8%. (Child Survival Project) These rates are somewhat higher that presented by Kramer (1987) --e.g., a 7% incidence --with a mean birth weight of 3,200. For purposes of comparison, the percent LBW in the Norway and Sweden are 3.8 and 7.0 while that in China is 6, in the United States is 6.9 and in England is 7.0. In the 5 countries assessed in Latin America the percent ranges from a low of 9.0 in Brazil and Chile to a high of 17.9 in Guatemala while those in the 8 countries examined in Asia range from 5.2 (Japan) to 30 (India). In Africa, Tunisia has a reported LBW of 7.3% while than in Nigeria is 18%. In summary, no data are available regarding the association of LBW and perinatal morbidity in Egypt. However, the reported rates of low birth-weight appear to place Egypt relatively well off compared with many other developing and even some developed countries, depending on which figures are accurate.

Finally, maternal death is associated with high rates of perinatal deaths worldwide (Koenig 1988). In Egypt, in a national study conducted among 772 maternal deaths, 57% of infants died close to or during the neonatal period. (MOH, 1994)

As noted throughout this discussion, many of these high risk characteristics are overlapping. Estimates of odds ratios for any single or combined risk category of maternal age, birth order, or birth space have been calculated for childhood mortality in Egypt. Overall only 25% of children are born without any of these risk categories. Thirty seven percent have a single risk category with a Risk Ratio of 1.94. Eighteen percent had two or more risk factors with a risk ratio of 3.32. The highest Risk Ratio was 7.4 for women over the age of 35 and having a birth interval of less than 24 months.

Factors influencing mortality rates: Substance abuse

While important determinants of adverse perinatal outcomes in

many countries [illegible] 1993), tobacco use and alcohol use are generally perceived to be rare events among women in Egypt and as such probably have a negligible impact on perinatal or neonatal morality and morbidity (Personal communication, R. Langstrom).

Factors influencing mortality rates: Maternal Medical Risk factors

Among the many medical risks that many affect perinatal and neonatal mortality there are several that are of particular importance globally either because of their high prevalence and/or because of the high risk associated with them: multiple pregnancy; poor weight gain anemia; malaria; Group B streptococcus disease; STDs including syphilis; pre-eclampsia/eclampsia; and, incompetent cervix. (Walsh 1993)

In Egypt little is known about the prevalence of these key medical risk factors but available information is summarized below:

Multiple pregnancies: No information available

Poor weight gain during pregnancy and/or low pre-pregnant weight or height: According to the 1995 DHS, only one-tenth of women had a height of less than 150 centimeters thereby being at higher risk for a difficult delivery. (DHS 1996) Likewise, few women were at risk for inadequate pre-pregnancy weight or body mass (e.g., only 2% had a body mass index of less than 18.5, the level indicating chronic energy deficiency among non-pregnant women). Thus, poor nutritional status seems not to be a major issue affecting perinatal or neonatal mortality in Egypt.

Anemia: Two studies have assessed the prevalence of maternal anemia in Egypt. In a study conducted in Giza, 63% of women had a hemoglobin level below 12gm/dl (Younis 1992). A somewhat lower rate (37%) was found in Menoufia in which anemia was assessed by nail-bed pallor (an indirect method). (Child Survival Project)

Malaria: Malaria appears to be problematic primarily in the southern regions of the Upper Egypt Nile Delta.

Group B Streptococcal Disease: No information is available.

STDs including syphilis: Little information is available regarding the incidence or prevalence of STDs in Egypt. Although there is a STD department within the MOHP, no STD control program has been developed. Of the registered cases of STDs from 1992 through 1995, gonococcal disease was the most prevalent followed by syphilis. Only [illegible] blood samples were tested by the Central Laboratory for syphilis (VDRL or RFP) of which 7.8% were reactive. However, only .6% were reactive by confirmatory TPHA. (Preble 1996) In Giza, among [illegible] rural "ever-married women, .8% of women were diagnosed as having syphilis and 8.6% chlamydia. None had gonococcal disease (Younis 1993) However, three studies conducted at the El-Hood-El-Marsoud STD Clinic confirm the high rates of gonococcal disease and syphilis among STD patients in Egypt (Bassily 1991; Saleh 1993; Amr 1993).

Pre-eclampsia eclampsia: Date regarding this important obstetric condition are not available. However, according to the 1995 DHS, .6% of deliveries were accompanied by convulsions. The

most likely cause of maternal convulsions would be eclampsia. A rate of eclampsia of nearly 1% of all deliveries is very high. Corroborating this indication that preeclampsia/eclampsia may be a major risk in Egypt is the finding from the "National Maternal Mortality Study: Findings and Conclusions" that hypertensive disease of pregnancy accounted for 110(15%) of the 718 maternal deaths and accounted for nearly one-quarter of the 499 deaths resulting from direct obstetric causes. (MOH 1994) This percent cause of maternal death is comparable with that in the United States (17%), Bangladesh (19%), and India (16%) and is lower than that in Jamaica (30%) but higher than that in Tanzania (4%) and Indonesia (5%). (Walsh 1993) In summary, given its apparent role on maternal complications, pre-eclampsia/eclampsia probably contributes substantially to perinatal mortality in Egypt.

Additional obstetric complications

According to the 1995 DHS, in the five years preceding the survey, there were 11,454 births and 216 neonatal deaths. Of these deaths, 19% occurred after a prolonged labor, 2.6 after excessive vaginal bleeding, 2% after a maternal vaginal infection, .2% after maternal convulsions (most likely to be eclampsia), and 75% after no apparent maternal/obstetric complications. (DHS 1996).

Causes of perinatal mortality

Direct Causes

The main causes of death globally during the neonatal and perinatal period are described in the introduction. Currently there is no data specific to Egypt regarding cause of perinatal and neonatal deaths, although some local data sets in which this issue might be explored are beginning to become available. For example, among the 17 deaths occurring in the 12 Menoufia Village study in 1990-91, 1 was due to respiratory infection, 3 to tetanus, 9 were "birth related" 1 was "other" and for 3 the cause was unknown. (Langstrom, Personal communication) In summary, there is an urgent need for data regarding cause of death during the perinatal and neonatal period in Egypt.

Finally, the 1995 DHS indicates that of the 7,121 women in the survey, 1,788 were first cousins of their husbands and 1,224 were other relationships. If these data are correct, the possibility of higher than-would-be expected birth defects should be assessed as this factor could substantially increase the perinatal mortality rate. In summary, data regarding birth defects as a cause of perinatal mortality is needed.

Health-Seeking and Health-Promoting Behavior

There is little data available regarding health-seeking and health-promoting behavior in the neonatal period. While data regarding health-seeking for neonates is not available, some relevant information is available in the "National Maternal Mortality Study" (MOH 1994). Although eventually 72% of women who

died were seen in a health care facility before death, there was a substantial delay in most cases. How many of the perinatal and fetal deaths reported in this study could have been avoided by more timely care for the mother is of course unknown. Likewise, health-seeking during the neonatal period has not been assessed.

Extrapolation from the 1995 DHS data regarding infants under 6 months of age likewise suggests that health-promoting behavior may be inadequate. While overall, only 10% of children who had diarrhea received neither ORS nor increased fluids, for infants less than 6 months of age, this figure was double that (20.9%). (DHS 1996) These figures do not indicate whether the failure to give appropriate treatment was a domestic decision or a health facility decision as about half of these children were taken to a health care facility. In summary, available data suggest that health-seeking and health-promoting behaviors are not optimal for the perinatal and neonatal period, but further information specific to this critical periods are needed as is greater analysis of what occurs at the household level and at the facility-level is needed.

Gaps and future needs

While a fair amount is known regarding perinatal and neonatal mortality in Egypt, prior to the development of targeted intervention strategies, additional information is necessary.

Highest priority needs

Causes of perinatal and neonatal mortality
What we do know: Essentially nothing is known about the causes of perinatal and neonatal mortality in Egypt.
What we do not know: -----
How we can find out as quickly as possible: A great deal can be learned as to main systems dysfunction through secondary analysis of an existing longitudinal data set. However, given that such data sets were probably developed to assess infant and under-fives cause of death, additional information will be necessary to differentiate deaths that might present in a similar fashion but have very different intervention implications (e.g., congenital cardiac disease, RDS, and sepsis). Thus, indepth re-interviews of families whose infants have died or been severely ill during the neonatal period would be very useful.

Perinatal and neonatal mortality rates
What we know: While neonatal mortality is decreasing, it is decreasing slower than other causes of childhood mortality. Therefore, neonatal mortality is responsible for an increasing percentage of childhood mortality.
What we do not know: How accurate are these rates? What are the rates of perinatal mortality?

How we can find out as quickly as possible: By conducting secondary analyses of existing data-sets in which data regarding pregnancy and early infancy has been collected in a prospective manner. Results from these data sets might be compared with the local registry of births and deaths to estimate the degree of under-reporting of perinatal deaths.

Health seeking and health promoting behavior

What we do know: Very little is know about health-seeking and health promoting behaviors during the perinatal and neonatal period, but that which is available indicates that health seeking may be delayed and health-promoting behavior may be sub-optimal.

What we do not know: What were the dynamics of health problem identification, health promoting behavior, and health seeking behavior in the first month of life at the household? What was done at facilities to which neonates were taken?

How we can find out as quickly as possible: Much information regarding problem identification, treatment, and health-seeking at the household level is contained in the AUC data set that would be readily available through secondary analysis. Likewise, actions taken at facilities as remembered by the parents would be available from these data sets. Finally, follow-up visitation to named facilities and practitioners could be done to try to gather further information about what, from the perspective of the practitioners, actually occurred at these visits (e.g., diagnostic procedures, diagnoses, and treatment or referral plans). Likewise, open-ended questioning of families with healthy neonates, with sick neonates who survived and with sick neonates who died would be extremely useful in helping to better understand household thought processes and actions regarding health promoting and health seeking.

Maternal antenatal and delivery care

What we do know: Prenatal care and delivery care have a strong inverse correlation with birth outcome. Antenatal care and supervised deliveries remain relatively low in Egypt in spite of some recent upward trends. There is sparse data regarding the quality of care received, but available data, although indicating some improvement, suggests that there is still considerable improvement to be made..

What we do not know: What actually does occur during prenatal visits and at supervised deliveries? Does quality of care differ greatly on the basis of public versus private facility and level of provider?

How we can find out as quickly as possible: From secondary analyses of existing data sets we can determine whether blood and urine were obtained at a prenatal visit and whether tetanus toxoid was given to the mother. We may be able to tell whether certain problems were discussed with the mother.

Through revisits to the facilities where mothers sought care, we may be able to determine what tests were ordered (or usually ordered) at prenatal visits. Key indicators such as urine for protein and sugar, blood for syphilis testing and glucose, and

blood pressure are monitored, We may be able to determine whether protocols exist and whether they are followed for key obstetric problems.

Other informational needs

Maternal location and education
What we do know: The neonatal mortality rate is higher in Upper Egypt, in rural areas, and among women with no education. Women of limited education are more likely to live in rural areas and in Upper Egypt.
What we do not know: To what extent do these factors operate independent of one another?
How we can find out as quickly as possible: Secondary analysis of an existing data set, whether a national data set such as the DHS or a regional data set

Maternal antenatal and delivery care
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How we can find out as quickly as possible: From secondary analyses of existing data sets we can determine whether blood and urine were obtained at a prenatal visit and whether tetanus toxoid was given to the mother. We may be able to tell whether certain problems were discussed with the mother.

Through revisits to the facilities where mothers sought care, we may be able to determine what tests were ordered (or usually ordered) at prenatal visits. Key indicators such as urine for protein and sugar, blood for syphilis testing and glucose, and blood pressure are monitored, We may be able to determine whether protocols exist and whether they are followed for key obstetric problems.

Maternal age, birth order, and spacing
What we do know: Extremes of maternal age and birth order as well as narrow birth intervals are associated with poor neonatal outcomes.
What we do not know: Are these factors also associated with fetal loss? To what extent do they operate independently (and independent of low maternal education and rural location)?
How we can find out as quickly as possible: Secondary analysis of existing longitudinal data sets that include information on

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perinatal and neonatal outcomes.

Maternal substance abuse, maternal weight and height and weight gain during pregnancy, and neonatal weight
What we do know: Existing data does not provide support that any of these factors is a major contributor to neonatal mortality.
What we do not know: What is the magnitude of weight gain and does it correlate with perinatal or neonatal outcomes? What are average birth weights and how does birth weight correlate with neonatal and perinatal outcomes?
How we can find out as quickly as possible: Because no existing data set appears to have obtained this information, a prospective study would be necessary. In the interim, secondary analyses assessing outcome and estimated birth weight could be done based on existing data sets.

Maternal risk factors
What we do know: Existing data suggest that pre-eclampsia/eclampsia constitutes a significant problem and that the prevalence of anemia is high. Maternal weight, height and body mass appear to not be a major problem. The little data that is available suggests that STDs are present.
What we do not know: With the exception of data regarding the prevalence of anemia and pre-pregnancy weight/height and body mass, data regarding any of these conditions is scarce and not representative. Nothing is known regarding the prevalence and/or role of Group B Streptococcus in neonatal morbidity.
How we can find out as quickly as possible: This information is probably not contained in existing data sets. Some information regarding weight gain during pregnancy, the prevalence of Group B streptococcus in hospital settings at the major universities, and the prevalence of pre-eclampsia/eclampsia at major universities may be available through published abstracts. As noted above, revisiting some of the health facilities identified by women enrolled in existing longitudinal studies may provide additional information regarding the rate of protein in urine, anemia, and positive STS (albeit without a good denominator). Otherwise, a cross-sectional survey of facilities or (ideally) a prospective study of women during pregnancy would need to be obtained, such as through the follow-up of the 250 currently pregnant women.

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January 20, 1998

MOTHERCARE/EGYPT
DIAGNOSTIC RESEARCH IN THE GOVERNORATES OF ASWAN AND LUXOR OF EGYPT

FINAL REPORT

SUBMITTED TO:

MOTHERCARE/EGYPT PROJECT

SOCIAL PLANNING, ANALYSIS & ADMINISTRATION CONSULTANTS

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تليفون : ٣٤٠٨١٦٠ فاكس : ٣٤٠٤٣٣٨

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25 deliveries were observed by a specialist obstetrician in 13 district and 2 general hospitals. The sample of deliveries was not chosen by random and is not specific for any Governorate or district However, we still believe that many of the findings would be similar in other units.

Most deliveries were attended by junior or resident medical staff (13) while 7 were attended by the head of the department, 1 by a specialist and 4 by an assistant specialist or senior resident. In no case were nurses the main care providers. 19 of the 25 deliveries were normal vaginal deliveries. There were 3 forceps and 2 breech deliveries while one Caesarean section was performed (for the single reported case of ruptured uterus). There was also a case of preterm labour Approximately ⅓ of all women underwent some kind of intervention including augmentation or induction of labour.

The data provided show that women perceive the service as friendly, but do not receive much (if any) explanations about the progress of labour or activities to be done by HPs. When meeting a mother, nearly all (24/ 25) HPs welcomed and reassured her (20/25) and were perceived as friendly (24/25). HPs generally helped women to get ready for examinations (24/25) but virtually never explained their findings to the mother (1/25).

General history taking was adequate (24/25) but only ⅔ (16/25) of HPs asked if the membranes had ruptured and if the mother had attended an antenatal clinic (16/25)[5]. Only 21/25 HPs measured the mothers blood pressure and 16/25 took her heart rate, only 20/25 performed an adequate physical examination and only 19/25 recorded antenatal and intrapartum history and findings accurately. When performing a vaginal examination only 12/25 of HPs took minimum antiseptic precautions and only 5/25 used sterile gloves[6]. Only 17/25 of the HPs checked the fetal heart at regular intervals.[7]

Delivery occurred in all cases with the mother lying on her back[8]. Less than half the instruments used for delivery were clean and sterilized. Even more seriously unsterile instruments or thread was used in more than ⅔ of cases to cut and tie the umbilical cord. At least 4 out of 25 babies were exposed to unnecessary cold stress (not dried or not covered with blankets). None of the babies was formally assessed at birth (no weights, anthropometrical measurements or Apgar scores at all). Only half the mothers were informed that their baby was fine and half were encouraged to breast feed. Management of the third stage is not described in the data

During all observed labours and deliveries no partograph were used, nor were any type of protocol or checklists. The available data does not provide information concerning the accuracy of the findings of any examination including blood pressure and findings on vaginal examination. From the provided data, it was not clear if women were encouraged to change their position frequently in labour and to empty

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[5]The longer the period between rupture of membranes and delivery the higher the risk of infection for mother and baby Even poor quality antenatal care should identify some abnormalities such as antepartum haemorrhage

[6]Frequent and/or unhygienic vaginal examination in labour are one of the most important risk factors for puerperal sepsis which is the 3rd most common direct cause of obstetric mortality in Egypt. National Maternal Mortality Study, Egypt 1992-3 MoH Child Survival Project. Cairo 1994

[7]It is likely that this is better than the regional average as 94 of the smaller health units (total 123) visited for the complete survey had no fetal stethoscope at all.

[8] This is a bad position as the weight of the gravid uterus can easily occlude the inferior vena cava which will lead to a decreased preload, a drop in blood pressure, decreased placental perfusion and fetal distress.

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their bladder regularly (as it should be the case). While the data provide information about procedures which are desirable, it does not list unnecessary or harmful intervention such as routine enemas in labour.

Postnatal Care

The National Maternal Mortality Study, Egypt, 1992-1993 showed that postpartum haemorrhage was the most common direct cause of maternal mortality (178 deaths) and caused more maternal deaths than the second (hypertensive disease in pregnancy, 114 deaths) and third most important causes (genital sepsis, 60 deaths) together. This confirms that in Egypt, too the mother is in more danger of losing her life in immediate postpartum period the mother than during any other time in her pregnancy.

Care in the immediate postpartum period requires the early detection of complications, and an appropriate response to them. Early detection requires regular and systematic observation of the mother's vital signs including pulse, blood pressure and blood loss. Only 20 of the 25 HPs observed took a blood pressure and 3 did not take a maternal blood pressure or a pulse. The majority of HPs (16/25) left the woman within 15 minutes of delivery and immediately after delivery of the placenta (13/25) and would not have been able to observe slow but steady blood loss. It is not clear if they delegated the task of observing the mother to other HPs. If they did so, those HPs would have to rely on adequate records to provide continuity of care. However only 3/25 recorded their postpartum observations in the patients records.

Insufficient communication between HP and mother was also a problem during the postpartum period. Only a fraction of the providers informed the mother to report back in the case of haemorrhage (18/25) or fever (16/25)

Contraceptive advice was offered only by 7/25 HPs. The 3/25 HPs who did not measure pulse, blood pressure or temperature did not provide advise for the postpartum period either.

Interpretation

The activities of HPs are determined by many factors which are not recorded in this analysis such as the availability of supplies necessary to perform certain tasks, motivation, knowledge and skills. One can assume that all HPs had the ability, knowledge and skills to take routine observation (fetal heart, maternal temperature, blood pressure and pulse rate) but only ⅔ did so.

It is possible that supplies could have been a problem (Aswan General Hospital has no proteinuria test kits). Even where the facility has a particular piece of equipment, it may not be accessible (Luxor General Hospital has only 1 working sphygmanometer, 1 autoclave, 1 working stethoscope, and 1 infant weighing scale, 1 pair of scissors and two fetal stethoscopes). If the equipment was accessible it may have been used preferentially (because of the observation). As HPs were observed by a senior colleague they may have changed their practice for the period of observation to their "best possible practice". The recorded observations may thus not reflect routine practice by the HPs observed, but the best possible case. Without adequate observation of labour, it will be difficult to perform necessary interventions in time. On the other hand the lack documentation of labour often leads HPs to assume that the progress of labour is slow which in turns causes unnecessary interventions such as "yet another vaginal examination" or injections to stimulate labour. In the sample observed 10 out of 25 women received drugs to stimulate labour, which is more than twice the rate as used in most labour wards in the UK.

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Care in this sample was provided by specialists or those undergoing specialist training. As specialist are concerned with abnormal labour and delivery, it may not be surprising that they were not very good at managing normal deliveries. The observer judged delivery care as competent in 7/25 of cases and felt that support and strengthening of skills is required in approximately 22/25 of cases observed.

To reduce the risk of adverse outcomes of normal deliveries it is necessary to avoid unnecessary intervention and to ensure minimum standards of cleanliness and sterility From the data provided it does not appear that these principles are followed. Changes in routine care for women in the immediate postpartum period are likely to lead to more health gains for mothers and babies than changes during the antenatal or intrapartum period.

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