

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

2125 pregnant women from two districts in Egypt (Minia and Qaliubia) were followed longitudinally for 12 months to determine their birth outcomes and neonatal and infant morbidity and mortality. There were 1913 live births. The perinatal mortality rates of 37 for Minia and 45 for Qaliubia are midrange by global standards. There were 32 stillborns, 26 neonatal deaths and 45 post-neonatal deaths. Health seeking rates and practices before and after delivery for the mothers and infants are described as are health care practices. Intervention implications are discussed.

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 impacts 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) 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 to be 43 per 1000 births, ranging from 9 in North America to 88 in Western Africa (Espeut, Unpub).

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 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. 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. However, in general 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 (Walsh 1993).

The Egyptian Situation There have been appreciable declines in the childhood mortality rate (e.g., death from birth until 5 years of age) in Egypt over the past two decades (DHS 1996). The most impressive decline has been among children after the first year of life, 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. By contrast, mortality during the first year of life has been reduced by only one-half during this same period of time (DHS 1996). As has been seen in other developing countries undergoing transition, neonatal mortality is responsible for an increasing percentage of childhood mortality in Egypt (e.g., neonatal mortality contributed 27% of all under-fives death 20 years ago but is now responsible for 37% of all under-fives deaths). Data is not available in Egypt regarding perinatal mortality rates.

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 (Cleland 1988) and in Egypt (DHS 1996) is inversely associated with neonatal, infant, and under-fives mortality rates. 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 (Walsh 1993, DHS 1996). While male deaths are more common in the neonatal period, in many parts of the world (Stanton 1994) including Egypt (DHS 1996), female deaths predominate subsequently. Both worldwide and in Egypt, first born and later born (e.g. birth order of 4 or greater) experience increased mortality rates (Walsh 1993, DHS 1996). Prior fetal loss is associated with higher rates of neonatal mortality both globally and in Egypt (Walsh 1993, DHS 1996). Increasing birth interval is inversely associated with mortality rates (DHS 1996, Walsh 1993). Finally, maternal death is

associated with high rates of perinatal death 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)

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 two most significant factors affecting mortality during the perinatal and neonatal periods are gestational age and birth weight (Berendes, 1993), birth weight appears to be 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 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 Indeed this association has generally been noted in multiple settings (Chi, 1981, Donaldson, 1984, Brown, 1985, IOM, 1985) However, this association 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 exists 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) Maternal antenatal and delivery care, 2) Mortality rates during the first year of life, 3) Symptoms

preceding deaths during the neonatal period and infancy, and, 4) Health seeking and health promoting behavior during the neonatal period and first year of life

Materials and Methods

Beginning in late 1995, a total of 6000 households (3000 in each of two Egyptian districts--Minia and Qalubia) were followed 5 times, at roughly 3 month intervals, for a total prospective period of one year. The two selected districts were chosen arbitrarily by the Ministry of Health to represent Upper and Lower Egypt respectively.

The baseline questionnaire included a retrospective pregnancy history that recorded all pregnancies the woman had had, whether they ended in fetal mortality, a stillbirth, or a live birth. In addition, at the baseline and at each subsequent follow-up interview, all ever-married 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 her 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 early fetal mortality, 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 live births, still births, miscarriages, or abortions.

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 later 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.

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 period refers to live born children who die during the first 28 days of life. Postneonatal refers to those live born infants who die from day 29 through one year of age. Infancy refers to the period extending from the day of birth through one year of life.

Results

Among the 6000 households, there were 2128 pregnancies including 1913 live births. Among the live births, 922 were female and 986 were male. However, vital rates are based on a subset of these events that occurred during the prospective year. During the study period there were 589 live births in Minia and 365 live births in Qaliubia, giving respective crude birth rates of 34 and 24 per 1000 population. Total fertility rates were 4.77 for Minia and 3.27 for Qaliubia. The mortality rates for the two districts are presented in Table 1.

Mothers

Prenatal Care

From where and whom is prenatal care obtained? What factors determine the source of prenatal care? When does care occur?

Overall, 78% of women received some prenatal care, 21% attended a Government Health Facility (GHF), only 23% went to a private doctor, and 33% sought care from both. Mothers older than 35 years were more likely to have received no care (36%) than younger mothers (19%). Among women who received any prenatal care, 82% did so during the first 5 months of pregnancy, 64% during the first trimester.

Among women seeking care from a GHF, 22% went for routine care and 78% 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. Forty percent of stillbirths occurred among women seeking care from private doctors only compared to 7% of those seeking care only from a GHF. Among women experiencing an early (preterm) delivery, only 37% of those attending a GHF did so for a perceived problem, while 72% of those attending a private facility did so for a problem. Among women ultimately experiencing a term delivery the differences were even more marked, with only 23% seeking prenatal care from a GHF did so for a perceived problem, while 78% of those seeking care from a private facility did so for a perceived problem. Women experiencing a fetal termination in months 4 through 6 generally received no care (44%) or care only from a private MD (44%).

What problems are women reporting in the prenatal period? For what problems are women seeking care?

Symptoms experienced by women and symptoms prompting health seeking behavior are summarized in Table 2. Abdominal pain and headaches (experienced by one-third of women) and swelling of the extremities (experienced by one-quarter of women) were the most frequent complaints overall, although less than one-half of women experiencing these problems sought medical attention. By contrast, among the 7% of women experiencing bleeding, three-quarters sought medical attention. Likewise, among the 16% experiencing fever, over one-half sought medical care.

Also shown in Table 2, birth outcomes differed on the basis of a few maternal problems. A somewhat higher percent of women experiencing abdominal pain (38%) experienced a stillbirth compared to those delivering live infants. More women reported bleeding who delivered a stillborn (12%) or an infant who died in the neonatal period (14%) compared to women whose infants survived more than 29 days (2%). One-tenth of women who delivered stillborns reported spotting while this rate was lower among those with live births.

What services are provided during prenatal visits? Does the quality of care differ on the basis of type of health facility (e.g. private versus government)? Does socio-economic status influence the services received?

As shown in Table 3, women seeking antenatal care from private physicians were more likely to receive diagnostic procedures than women attending a GHF. By contrast, women attending GHFs were more likely to receive tetanus toxoid than women receiving antenatal care from private physicians.

As shown in Table 4 from page 8, however, mothers attending GHFs who delivered a stillborn were less likely to receive any of the diagnostic procedures than women delivering

liveborns. Among women seeking care from a private doctor, diagnostic procedures did not vary in any way consistent pattern by birth outcome. Women whose infants died in the neonatal period were somewhat more likely to have received one or more of the 7 diagnostic procedures than women whose infants survived the neonatal period.

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. This phenomenon was not apparent at private facilities. For example, at GHFs 53% of women presenting with a problem had their blood pressure measured compared to only 15% of women making routine visits. Women presenting to GHFs with problems, compared to women making routine visits, were fourfold more likely to have their abdomens (43% versus 9%) and fetal hearts (33% versus 7%) examined and were more than twice as likely to have their weight measured (22% versus 10%) and to provide a blood (17% versus 6%) or urine specimen (19% versus 7%) than women presenting for routine visits. 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 (94% versus 55%).

Labor and Delivery

Who attends deliveries?

As shown in Table 5, the greatest proportion of deliveries were attended by "dayas" (e.g., Egyptian traditional birth attendants) (62%), the daya was the responsible health professional for 52% of all deliveries. Thirty-eight percent of the dayas were said to be trained and 30% were noted by the mothers to have their 'Certificates of Training'. Next most frequent were physicians who

were present at 32% of all deliveries. Nurses are present for 18% of deliveries, they were “in-charge” for 71% of these deliveries. Other female relatives were present at 78% of deliveries and husbands were present for 33% of deliveries. Less than one percent of deliveries were unattended. As shown in Table 5, birth outcomes did not vary by attendant.

Nearly three-quarters (72%) of deliveries occurred in a home (63% the women’s home), less than 1% in a government clinic, 14% in a government hospital, and 11% in a private hospital. Sixty-one percent of all deliveries occurred in rooms described as “well-lighted”. Forty percent of dayas changed their shoes before the delivery, although only 35% changed their clothes.

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

Overall, 8% of deliveries lasted more than 24 hours. Sixteen percent of women reported unclear amniotic fluid. Seven percent reported abnormal presentations and an additional 2% reported a prolapsed cord. Six percent reported serious bleeding during delivery and 17% reported it after delivery. Three percent reported a seizure, 6% high blood pressure, 5% a uterine rupture, and 5% a rectal tear.

Overall, 96% of deliveries were vaginal, (5% forceps and 4% by vacuum) and 4% were by Caesarean-section. Forty-six percent of forceps deliveries, 3% of Caesarian deliveries, and 17% of vacuum extractions occurred in the home. In all, 46% of women received medication to hasten delivery, of whom 75% received an injection, 59% a drip and/or 4% an oral medication. While 76% of forceps deliveries were conducted by a doctor and/or a nurse, 24% were conducted a daya as were 9% of vacuum extractions. Birth outcomes did not differ significantly by mode of delivery.

While use of medications was most common by physicians (80% of physician-attended

deliveries), medications were also frequently used by nurses and nurses-daya combinations (68%) and by dayas alone (20%) Medications to accelerate delivery were employed in 83% of hospital-based deliveries and in 28% of home-deliveries Thus, given the large proportion of all deliveries which occur in the home, 53% of all deliveries in which medications were used to accelerate delivery occurred in the home Sixty-three percent of stillbirths had received medication to hasten delivery (compared to 46% overall), of whom 80% of whom had received medication by intravenous drip (compared to 59% overall) Among the 32 stillbirths, 50% had received an anesthetic compared to only 35% of those who survived infancy Anesthetics other than traditional remedies were used in 69% of hospital deliveries and 27% of home deliveries The umbilical cord was cut by a blade (27%), scissors (32%), or a cutter (3%) The utensil was cleaned by boiling (36%) or alcohol (5%) most frequently but was not cleaned (3%), was cleaned by spit (1%) or other (24%)

Infants

What were the birth rates and mortality-rates by age? 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 stillbirths, 50% of which were male Among the live births, there were 35 deaths during the neonatal period, 26 (74%) of which occurred in infants 7 days or less Forty-five additional deaths occurred among infants ages 1 to 12 months, for a total of 112 stillborn/infant deaths Males accounted for 62% of deaths in the first week, 33% of neonatal deaths and 42% of post-neonatal deaths

As seen in Table 6, the relationship between survival through infancy and estimated birth weight was a bell-shaped curve, those who were perceived to be very large or very small were at

especially high risk (Of note, however, only 6% of infants were actually weighed) The relationship of small size and infant death was not seen among gestations lasting nine months Among all births, only 5% were considered by their parents to have been premature, compared to 33% of those dying within the first year of life (and 45% of those dying within the first month of life) All 4 infants born at a estimated gestation age of 6 months died prior to delivery or within the first week of life as did 6(55%) of those born at 7 months, 3(17%) of those born at 8 months and 11 (1%) of those born at term

Women experiencing a stillbirth were less likely to have received any care (40% reported no prenatal care) than women whose infant subsequently survived (22%)

Among all infant deaths, 75% occurred at home and only 17% in the hospital, although earlier deaths were somewhat less likely to occur at home than later deaths (e g , 65% of deaths in the less than 7 days, 75% of those age 8 to 28 days and 81% and 81% of post-neonatal deaths)

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 56% were either never obviously ill or showed evidence of illness for less than one day By contrast, this situation applied to only 12% of the 42 deaths occurring in the post neonatal period

The most common presenting symptoms among the infants who ultimately died were diarrhea (26%), cough (15%), respiratory difficulty (7%), and fever (24%) The percent of infants experiencing these symptoms in the two week prior to death were very similar All of these symptoms were more common among older infants than among newborns, including fast breathing (15% of those less than 7 days 25% of those 1 to 4 weeks and 42% of those 1 to 12 months at the

time of death) The only exception to this pattern was for yellow eyes (e g , icteric sclerae) which was experienced by 8%, 50% and 12% respectively for infants dying in the first week, the neonatal period and the post-neonatal period Among infants dying after experiencing vomiting or diarrhea, 7 (88%) neonates and 13 (52%) post-neonates experienced a dry mouth/tongue and a roughly equivalent percent experienced sunken eyes (e g , evidence of dehydration)

Some care was sought for 61% of infants prior to their death Twenty-two percent received care only from a doctor, 5% only from a hospital and 18% from both Care was more commonly sought from doctors and hospitals for older infants (88%) than for neonates (50%) and was least commonly sought for those dying in the first week of life (23%) Care was sought for all infants who experienced both coughing and rapid breathing and for nearly all of those with coughing without rapid breathing (90%) and most of those with rapid breathing without coughing (80%) Likewise, care was sought for nearly all with vomiting and diarrhea (92%), the majority of those with diarrhea without vomiting (67%), and vomiting without diarrhea (82%) The presence of fever 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)

Among the 34 infants dying in the first month of life on whom a verbal autopsy was performed, 11 were believed to be preterm Seven neonates did not breath normally at birth (6 of these 7 infants subsequently died in the first week of life) Likewise, 8 did not cry normally at birth, seven of whom died in the first week of life Two infants dying in the neonatal period experienced convulsions and 5 of the infants stopped nursing normally Five were described as limp or unconscious, 4 of whom died in the first week Four infants were described as having "crackles" (rales) 5 as "grunting", 5 as retracting and 3 as wheezing

Overall, 24% of the infants who died in their first year of life received antibiotics and 17% received ORS. However, among infants dying with respiratory symptoms, none of those dying in the first week of life, one of those dying in the next 3 weeks and 13 (52%) of those dying in the post-neonatal period received antibiotics. Likewise, of the 33 infants with diarrhea, none of the 8 who died below 1 month received ORS compared to 13 (52%) of those who died in the post-neonatal period. Only 2 (3%) children were reported to have received intravenous medications prior to death and only 6(8%) received oxygen.

Discussion

A high percentage of women seek both routine and “problem-based” prenatal care from both private doctors and government health clinics. Care is sought early in pregnancy. Women appear to recognize symptoms which might be associated with poor pregnancy outcomes, but health-seeking on the basis of these symptoms appears to be irregular. Routine care is largely sought from the government facilities while problems are directed towards the private sector.

Diagnostic procedures are less frequently performed in GHFs compared to private physicians offices. Diagnostic procedures performed did not vary by birth outcome, but procedures were significantly less likely to be performed in GHFs prior to a stillbirth than a livebirth.

Dayas are the most frequent attendants at birth and most deliveries occur in homes. Complex deliveries did occur in homes and both anesthesia and medication designed to accelerate delivery were administered in homes. Medications were administered by dayas. Medication use was negatively associated with birth outcome.

Perinatal mortality rates for the two districts are mid-range by global standards. Consistent with the literature, very high and low birth weights were adversely associated with survival as was

prematurity Most deaths occur in homes (rather than the hospital) Parents do not appear to recognize symptoms of illness among very young neonates and care is less frequently sought even when symptoms are recognized

Although care was sought for most infants with diarrhea and or vomiting, ORS was not routinely used, especially for neonates Likewise, antibiotics were not routinely use for infants with respiratory symptoms even though care was sought ORS and antibiotics were rarely used for neonates dying in the first week of life

Intervention Implications

Interventions targeting only government facilities may not have the desired impact given that women with perceived abnormalities/problems will not seek care for these issues at these locations Interventions should address both the community (in order to change the perception that only normal pregnancies can be addressed at government facilities) 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) preferentially seek care

Overall, there appear to have been many “missed opportunities” for routine screening at all facilities, although this problem was substantially greater at government facilities than at private facilities Interventions should address the importance of such routine screening measures since a high percentage of women are presenting for care in large numbers and relatively early in the pregnancy

The high rates of deliveries requiring forceps, Cesarean Section and vacuum extractions in uncontrolled settings (e g , homes) is of concern Likewise, the high rates of medication administered to hasten delivery are potentially problematic, especially given that over one-half were administered

in uncontrolled settings (e g , in home deliveries)

Given the apparent association of low (and very high) 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. 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 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 the treatments are not provided to these infants indicates the urgent need for health education interventions targeting both parents and health professionals.

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TABLE 1

Births or Population, Deaths and Death/Mortality Rates Minia and Qalubia - 1995-1996

Age Group	Pregnancies/ Births/ Population	Death/ Mortality Rate	DHS-1995 Mortality Rates 1985-95
Minia			Upper Egypt
Perinatal (5 months)	600	37	
Perinatal (6 months)	596	30	
Neonatal	589	32	47
Post-Neonatal	589	39	51
Infant	589	71	98
Qalubia			Lower Egypt
Perinatal (5 Months)	382	45	
Perinatal (6 months)	380	39	
Neonatal	365	25	33
Post-Neonatal	365	22	28
Infant	365	49	61

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

TABLE 2**Percent Distribution of Pregnant Women by Problems and
The Last Two Months and Health Seeking**

<i>Problem</i>	SOURCE OF CARE			
	<i>Total With Problem</i>	Care by GHF and Doctor	Care by GHF Only	Care by Doctor Only
<i>Abdominal Pain</i>	33.7	7	8.2	37.0
<i>Severe Headache</i>	30.3	8	8.0	36.4
<i>Swelling</i>	25.4	6	7.5	34.6
<i>Fever</i>	15.5	3	8.6	44.3
<i>Bleeding</i>	6.8	2.1	14.1	59.9
<i>Spotting</i>	4.1	0.0	15.2	31.8

TABLE 3

Percent of Women Having Specific Problems By Outcome of Pregnancy

<i>Problem</i>	<i>Total With Problem</i>	Still-Birth	Live Birth Died < 29 days	Live Birth Survived 29+ days
<i>Abdominal Pain</i>	33.7	38.2	22.9	33.0
<i>Severe Headache</i>	30.3	27.3	25.7	29.8
<i>Swelling</i>	25.4	14.7	25.7	27.7
<i>Fever</i>	15.5	17.6	14.3	14.7
<i>Bleeding</i>	6.8	12.1	14.3	1.7
<i>Spotting</i>	4.1	10.0	0.0	3.8

TABLE 4
Number (%) of Women Receiving Antenatal Services Received According to
Site of Health Source (Government Health Facility (GHF) or Private MD)

<u>Procedure</u>	<u>Private MD</u>	<u>GHF (%)</u>
Blood Pressure	931(84)	266(24)
Weight	197(18)	166(15)
Palpate abdomen	921(83)	187(17)
Check legs	373(34)	76(7)
Check fetal heart	610(55)	90(8)
Blood sample	119(11)	102(9)
Urne sample	167(15)	111(10)
Breast Feed Ed	210(19)	67(6)
Tetanus Toxoid	177(16)	974(87)

TABLE 5

**Number (%) of procedures performed according to birth outcome and source of care
(Private MD or Government Health Facility)***

<u>Procedure</u>	Private MD			Government Health Facility		
	<u>Stillbirth</u>	<u>Neonatal Death</u>	<u>Neonatal Survivor</u>	<u>Stillbirth</u>	<u>Neonatal Death</u>	<u>Neonatal Survivor</u>
Blood pressure	19(83)	16(89)	896(84)	3(14)	7(39)	256(24)
Weight	3(13)	4(22)	190(18)	0(0)	4(24)	162(15)
Palpate abdomen	12(52)	13(72)	896(84)	2(10)	6(33)	179(17)
Check legs	6(26)	4(22)	363(34)	0(0)	2(12)	74(7)
Check fetal heart	14(61)	6(33)	590(56)	1(5)	3(17)	86(8)
Blood sample	1(4)	2(11)	116(11)	0(0)	3(17)	99(9)
Urine sample	1(4)	3(17)	163(15)	0(0)	2(11)	109(10)
Tetanus Toxoid	2(9)	2(11)	173(16)	16(76)	15(83)	943(87)

*Total numbers for each outcome category may be lower than actual because of missing data

TABLE 6
Attendants at birth by outcome*

Attendant	Overall	Stillbirth	Neonatal Death	Infant Death	Survivor
Daya	1196(62)	8(1)	21(2)	34(3)	1133(95)
Doctor	618(32)	24(4)	16(3)	8(1)	570(92)
Nurse	348(18)	9(3)	6(2)	4(1)	329(95)

*Numbers total more than number in each outcome category since infants may have had more than one attendant at birth

TABLE 7**Perceived size of newborn (born after a six month gestation) at birth according to outcome**

<u>Perceived size</u>	<u>All live births</u>	<u>Births who survive infancy</u>	<u>Neonatal deaths</u>	<u>Infant deaths</u>
Very small	194(10)	179(92)	6(3)	1(1)
Small	301(16)	286(95)	5(2)	9(3)
Average	1263(66)	1203(95)	20(2)	27(2)
Large	145(8)	133(92)	3(2)	6(4)
Very Large	15(21)	11(73)	1(7)	2(13)

TABLE 8**Number (%) infants experiencing symptoms at any time prior to death according to age at death**

SYMPTOM	< 7 DAYS	8 DAYS to 4 WEEKS	1 MONTH to 12 MONTHS
Cough	2(8)	2(25)	18(44)
Fast breathing	4(15)	2(25)	17(42)
Fever	2(8)	3(38)	29(71)
Chills	2(8)	7(13)	5(12)
Yellow eyes	2(8)	4(50)	5(12)
Red urine	1(4)	0(0)	5(12)
Diarrhea	2(8)	1(14)	19(48)
Vomiting	4(15)	2(25)	19(48)