# REPRODUCTIVE HEALTH IN AFRICA: ISSUES AND OPTIONS

*Edited by*
*Barbara Janowitz*
*JoAnn Lewis*
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# INTRODUCTION

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*Nadine Burton, Sylvia Wallace and Barbara Janowitz*

## A. The African Setting

Despite the territorial vastness and the geographic and cultural diversity of sub-Saharan Africa, the health status of the people is strikingly similar for most areas. That status is far from optimal. According to estimates made in the mid-1970s, 18% of Africa's population is under 5 years of age and 44% is under 15 (Ejomi-Martin and Monekosse, 1981). By comparison, only 7% of the United States' population in 1980 was under five years of age and 23% under 15 (U.S. Dept. of Commerce, 1981). Birthrates average 46 per 1000 compared with 17 in developed countries, and the death rates are more than twice as high as in the developed world (Ejomi-Martin and Monekosse, 1981). Infant mortality rates average 118 and in some countries are in excess of 200 per 1000 live births (Haub, 1982). Extremely high mortality rates in children under age five and in women of childbearing age contribute to an overall life expectancy of less than 40 years (Ransome-Kuti, 1981). African infants die as a result of low birth weight, infections, and inadequate perinatal care. Women die from a variety of childbirth complications, with pregnancies that are too early, too late, too frequent, and/or too numerous.

Health facilities are not adequate. Funds and equipment are scarce. There are acute shortages of trained care providers, particularly in the rural areas where almost 80% of the people live (Ransome-Kuti, 1981). While improvements have been made in availability of trained health personnel in some countries, they have not kept up with population growth.

Policy makers in most countries of sub-Saharan Africa are only beginning to be aware of the implications of high fertility and rapid population growth for social and economic development. Most countries have no stated or implicit policies regarding control of population growth or promotion of family planning and child spacing. In fact, some countries have policies that are overtly pronatalist, with little recognition of the long-term effects of such policies on the development prospects of the country (Mabogunje, 1981).

## B. Maternity Care Monitoring (MCM)

To accelerate development of maternity care in African countries and to use limited resources as effectively as possible, health care providers must know the characteristics of patients they serve and the risks associated with those characteristics. However, collecting information on patients can be an expensive and time-consuming process, even in developed countries. Many maternity hospitals and centers in developing countries have no opportunity to evaluate their services systematically and lack the tools to determine the most effective means of improving pregnancy outcomes for mothers and infants.

In the mid-1970s, Sudanese investigators participating in FHI-sponsored clinical trials of various contraceptives requested assistance with the development of a system of maternity care measurement. The lack of a systematic tool to achieve improvement in maternal and perinatal health had become apparent to increasing numbers of physicians, and they felt that a continuous "maternity survey" would be useful to identify and monitor areas where specific interventions were needed.

Initial pretesting of the maternity care information system was a cooperative effort between Family Health International and the International Federation of Gynecology and Obstetrics (FIGO), involving more than 20 hospitals in almost

as many countries. Since the presentation of pretest results at the FIGO meeting in 1976, the system has been used to gather information on obstetric deliveries of more than half a million women in 61 countries. The efforts have been sponsored by contracts and grants from the U.S. Agency for International Development.

The system is based on a single-sheet, pre-coded questionnaire, the Maternity Record (Appendix I), used to record data on deliveries in hospitals, maternity centers and other health service facilities. Information recorded at the time of delivery includes sociodemographic characteristics, obstetric history, contraceptive practices, antenatal care, management of labor and delivery, and maternal and perinatal outcomes.

The stated objectives of the Maternity Record are:

1. To provide information on the reproductive histories of women to identify groups at increased risk of complications.
2. To provide information on selected antenatal conditions to identify factors affecting pregnancy outcome and maternal health.
3. To provide information on the management and outcome of deliveries to identify specific management techniques that improve pregnancy outcome.
4. To provide information on family size expectations and contraceptive behavior to determine whether hospitals are meeting the family planning needs of their patients.
5. To provide a source of current information for developing instructional materials to improve standards of teaching and training in health.

Initially the Maternity Record was used in major referral centers and teaching hospitals, where it continues to serve as an important source of information to meet a variety of needs. Subsequently the importance of including smaller hospitals and maternity centers in order to provide a more comprehensive picture of maternity care services in a country or region became apparent. In many of these centers, some of them staffed only by nurses and midwives, the Maternity Record proved to be too long and difficult to complete. The result was the development of a "Maternity Record Summary" (Appendix II), a shorter version leaving out those questions presenting the most difficulty for these smaller, more modestly equipped and staffed centers. The questions retained from the long Maternity Records, however, were identical on the summary and used the same computer programming for data processing and analysis so that data from a variety of centers within a country or region could be easily pooled or compared.

Most recently, in recognition of the fact that in many countries, the vast majority of women deliver their babies at home assisted by a traditional birth attendant, FHI has been experimenting with ways to obtain information on non-institutional deliveries.

The Maternity Care Monitoring system has received international recognition as a valuable interdisciplinary data source and a cost-effective tool. Several countries, including Thailand and Indonesia, have used the Maternity Record as the basis of their national maternity care data collection systems. Maternity care monitoring, using this simple, routinely completed record, serves not only to identify problems but also to monitor the progress of programs designed to improve maternity and family planning care. Maternity care monitoring data are widely used to demonstrate the need for and effectiveness of postpartum contraceptive service programs by providing information on the relationship between high fertility and poor pregnancy outcomes.

## C. MCM in Sub-Saharan Africa

This monograph presents findings on various aspects of maternity care and birth spacing among women delivering in 23 sub-Saharan African hospitals participating in this program. It is by no means an exhaustive analysis but rather a summary of selected issues that can be addressed using the Maternity Record data. Among the aspects of maternity care discussed are obstetric practices, resource allocation and maternal mortality. In the area of birth spacing, family size intentions, breast-feeding and contraceptive use, abortion experience, contraceptive plans and postpartum sterilization are considered. Finally, some of the implications of these data for the improvement of obstetric services and future directions in maternity care monitoring are outlined.

The paucity of existing data on sub-Saharan Africa encourages cautious generalizations from these 23 individual studies. However, it should be emphasized that in most of sub-Saharan Africa, the vast majority of women do not deliver in a hospital environment, they do not receive any form of prenatal care, and family planning is neither part of their cultural environment nor accessible to them. The data presented here provide useful information about maternity care in these 23 centers and have proved instructive in the design of new studies. They are also illustrative of deliveries occurring in various types of institutional environments in ten African countries. Despite the overstretched nature of many services, the centers studied may represent the best care available to much of the population.

## D. Participating Centers

Table 1 lists the participating centers, by country, and gives the size of the caseload, the type of population served, and whether the institution is a referral center. Figure 1 shows the geographic location of the centers. Of the 23 centers discussed in this monograph, 15 serve mostly urban populations, with three of these 15 also providing care to significant numbers of women from rural areas. Thirteen of the hospitals are major referral centers.

Centers in rural areas are often free-standing maternity units that are not part of a larger hospital complex; they serve a widely dispersed population. To reach such centers, many women must travel considerable distances under difficult conditions. Roads are generally poor or non-existent, and means of transportation are limited. Situations such as this not only create barriers to the routine provision of antenatal care but also aggravate the problem of timely referral of women with complications requiring special care at the time of delivery.

The staff available to care for patients varies considerably among centers. At most centers trained midwives handle the majority of deliveries, calling on a doctor or referring the patient to another institution only in extemely difficult situations. Some maternities (Hamdallaye Maternity in Mali and Nyundo Maternity in Rwanda) have no doctor in residence; thus, midwives and nurses provide all of the services.

There is a general lack of basic resources for providing care for anything other than normal deliveries. Even among the large urban referral centers and university hospitals, not all have neonatal intensive care facilities for premature or otherwise jeopardized infants. In many centers, blood for transfusions, anesthesia equipment, drugs and oxygen are not consistently available; even

**Table 1. Characteristics of Hospitals and Maternities Participating in the Maternity Care Monitoring Program in Sub-Saharan Africa**

| Center Identification | Number of Deliveries Monitored | Study Period | Population Served | | Type of Center | |
|---|---|---|---|---|---|---|
| | | | Urban | Rural | Major Referral Center | Has Facilities for Surgical Deliveries |
| Ghana, Korle-Bu UTH,* Accra | 4990 | 8/81-8/82 | X | | X | X |
| Ivory Coast, Cocody U TH, Abidjan | 299 | 2/82-3/82 | X | X | X | X |
| Mali, Hamdallaye Mat., Bamako | 8750 | 3/79-2/81 | X | | | |
| Nigeria, Benin City UTH, Benin City | 3303 | 11/81-10/82 | X | | X | X |
| Nigeria, Ibadan UTH, Ibadan | 993 | 1/77-6/77 | X | | X | X |
| Nigeria, Ilorin U TH, Ilorin | 241 | 3/81 | X | | X | X |
| Nigeria, St. David's Clinic, Lagos | 120 | 9/81-11/81 | X | | | |
| Rwanda, Nyundo Mat., Gisenyi | 4066 | 12/79-10/82 | | X | | |
| Senegal, Abass N'Dao Mat., Dakar | 10730 | 12/80-11/81 | X | | | X |
| Sierra Leone, Princess Christian Hosp., Freetown | 5788 | 11/80-11/81 | X | | X | X |
| Sudan, Damazine Hosp., Damazine | 86 | 7/79-2/80 | | X | | X |
| Sudan, El Obeid Hosp., El Obeid | 154 | 12/79-3/80 | | X | | X |
| Sudan, Khartoum General Hosp., Khartoum | 1131 | 1/77-5/80 | X | | X | X |
| Sudan, Khartoum North Hosp., Khartoum | 2399 | 4/79-10/81 | X | | X | X |
| Sudan, Soba U TH, Khartoum | 506 | 5/79-4/80 | X | | X | X |
| Sudan, Omdurman Mat., Omdurman | 1552 | 4/79-2/81 | X | | | X |
| Sudan, Port Sudan Hosp., Port Sudan | 303 | 8/79-5/81 | X | X | | X |
| Sudan, Singa Hosp., Singa | 100 | 3/80-5/80 | | X | | X |
| Sudan, Wad Medani Hosp., Wad Medani | 1540 | 5/79-2/81 | X | X | X | X |
| Tanzania, Kilimanjaro Medical Center, Moshi | 1956 | 7/80-3/81 | | X | X | X |

| | | | | | | |
|---|---|---|---|---|---|---|
| Tanzania, Bugando Hosp., Mwanza | 3986 | 12/81-11/82 | X | X | X | X |
| Tanzania, Tarime Hosp., Tarime | 245 | 10/81-10/82 | | X | | X |
| Zaire, Karawa Christian Missionary Hosp., Karawa | 1790 | 4/81-6/82 | | X | X | X |

*UTH - University Teaching Hospital.

the most simple surgical implements are in short supply almost everywhere. In many cases, antenatal records are either not kept or are stored in such a way as to be unsuitable for use when a woman presents herself to deliver. This is complicated by the fact that women often come to the hospital for delivery at an advanced stage of labor, leaving little time to make use of even what records may be available.

Information obtained from correspondence and on-site visits indicates that although these studies encompass different levels of care in almost a dozen different countries, the 23 centers have in common insufficient staff, facilities, drugs and equipment and a high percentage of patients who arrive for treatment in a crisis situation.

### E. Data Limitations

One of the main purposes in designing the maternity care monitoring program was to provide participating institutions with an internal monitoring system to assist them in improving quality of care within the framework of existing resources. A more far-reaching goal was to provide aggregate data for a region or a country, with several institutions participating in the program over a period. The studies conducted under this program have often provided the only information on obstetric care available in many of the countries. It must be emphasized, however, that no effort was made to obtain a representative sample of participating institutions in the countries concerned. Centers were *self* selected, often on the basis of personal interest and availability of staff with sufficient time to conduct the studies.

These data may be related to circumstances outside the hospital setting. Some women delivered at home and were seen at the hospital for well-baby care; some women who delivered at home were subsequently treated at the hospital for postpartum complications, and some women delivered either in transit to the hospital or before reaching the delivery room. Unfortunately, these cases cannot always be readily identified. On the other hand, cases were excluded in some hospitals. At one hospital, for example, because of a shortage of staff, only women in the ward assigned to routine, uncomplicated deliveries were included. There are breaks in the collection of data in other centers, possibly because only certain personnel completed the records. In all these cases, some bias is introduced; usually, but not always, the direction of bias is known. Where there is evidence to suggest that the inclusion of certain data sets biases the results, these data have either been excluded or the biases are discussed.

Another problem concerns referrals; the data do not permit the separation of women referred from great distances to the hospital from those residing in the immediate area of the hospital. It is also impossible to determine whether

women were referred from the reporting hospital to other institutions and what happened to them once they left the reporting hospital.

A final limitation is inconsistency of coding. Training in the completion of the Maternity Record was based on the Maternity Record Instruction Manual and other supporting documentation developed for this purpose by FHI. Each investigator was supplied with copies of these standard instructional materials prior to the initiation of data collection at his or her center. However, on-site training by FHI staff was possible in some instances and not in others. Consequently investigators' interpretations of some items covered by the instructional materials may vary among centers. The nurses, midwives and doctors who acted as data collectors have a wide diversity of educational backgrounds. Also, among the institutions that trained these medical personnel, there is a diversity of attitudes, ideologies and clinical practices. Consequently, reported differences between institutions may actually be due to differences in interpretation of the various questions rather than actual differences in patients.

In spite of these limitations, the MCM data collection system has been a useful (and often the only) tool to assess maternity care services in African countries.

Figure 1. Geographic Locations of Participating MCM Locations in Sub-Saharan Africa

# MATERNITY CARE

### A. Antenatal Care

The value of antenatal care has long been a subject of controversy. Experience with preventive medicine suggests that antenatal care would carry with it some benefits for the mother and her potential newborn. Some, however, argue that social, demographic, and medical determinants of the utilization of antenatal services may be responsible for the benefits usually attributed to the care itself (Hall et al, 1980), whereas still others suggest that antenatal care may have differential effects on various groups even after the effects of social influences have been controlled (Greenberg, 1983). The section that follows explores some of the basic relationships between antenatal care, parity, education and survival in the sub-Saharan African context.

Although data on the actual type of antenatal care received are not available, a surprisingly high percentage of the women did receive some care (Table 2a). Data are not available for all centers, since some completed a record that did not include such information. Contrary to expectation, there is no strong positive association between education and antenatal care, and in one case (Karawa), the number of antenatal visits is negatively associated with education (Table 2b).

Whether or not a woman receives antenatal care, and when in her pregnancy that care is initiated, were associated with the outcome of the pregnancy. Figure 2 shows the relationship between antenatal care and infant death for women delivering at Korle-Bu Hospital in Accra, Ghana.

**Figure 2. Percent of Infants Dying Before Mother's Discharge from Hospital, by Parity and Number of Antenatal Visits, Accra, Ghana**

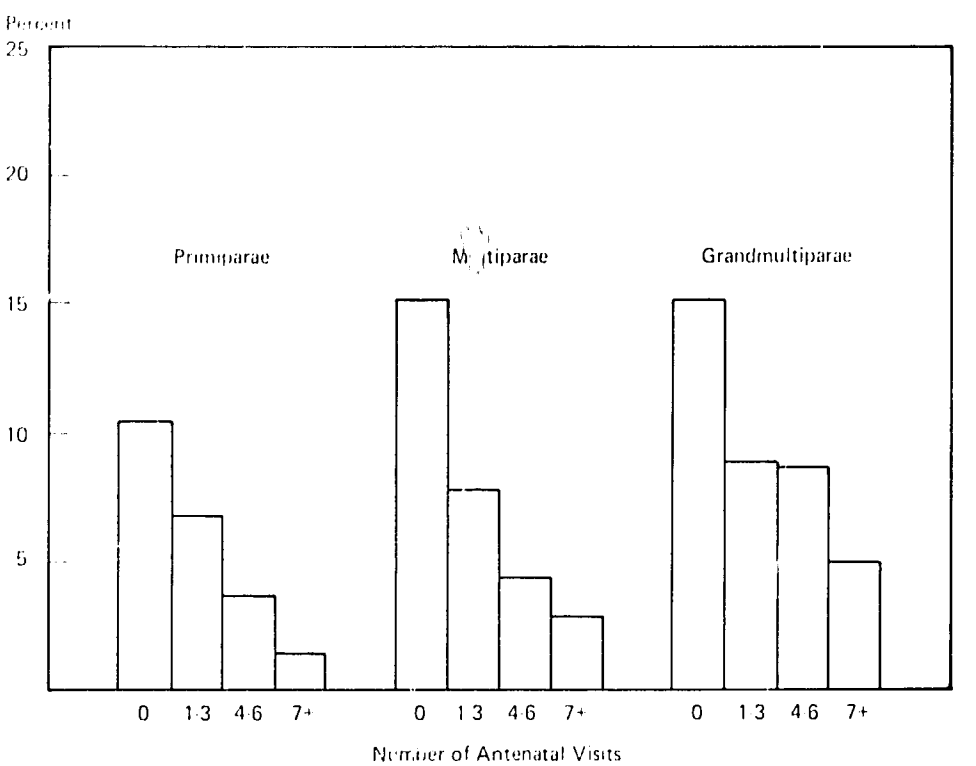


**Table 2a. Antenatal Care in African Maternity Hospitals (Percent Distribution)**

| Hospital | Number of Antenatal Visits 0 | 1-3 | 4-6 | 7+ | Total |
|---|---|---|---|---|---|
| Ghana: Accra | 6.7 | 20.6 | 44.8 | 28.0 | 100.0 |
| Mali: Bamako | 23.6 | 4.6 | 46.9 | 24.9 | 100.0 |
| Nigeria: Benin City | 5.3 | 2.9 | 26.3 | 65.5 | 100.0 |
| Rwanda: Gisenyi | 4.8 | 76.9 | 18.3 | 0.0 | 100.0 |
| Tanzania: Moshi | 1.7 | 18.6 | 48.0 | 31.7 | 100.0 |
| Tanzania: Mwanza | 0.4 | 30.1 | 46.9 | 22.6 | 100.0 |
| Tanzania: Tarime | 1.6 | 30.7 | 45.9 | 21.7 | 100.0 |
| Zaire: Karawa | 9.7 | 35.1 | 42.3 | 13.1 | 100.0 |

**Table 2b. Antenatal Care in African Maternity Hospitals: Median Number of Antenatal Visits by Education**

| Center | Total | Education No Education | 1-6 years | 7-8 years | 9+ years |
|---|---|---|---|---|---|
| Tanzania: Mwanza | 4.4 | 4.2 | 4.2 | 4.5 | 4.8 |
| Tanzania: Tarime | 4.4 | 3.9 | 4.0 | 4.6 | * |
| Tanzania: Moshi | 5.1 | 4.2 | 4.9 | 5.4 | 7.6 |
| Rwanda: Gisenyi | 2.5 | 2.3 | 2.6 | * | * |
| Nigeria: Benin City | 7.5 | 6.2 | 7.2 | 7.5 | 7.7 |
| Ghana: Accra | 4.8 | 4.3 | 4.4 | 4.5 | 5.5 |
| Zaire: Karawa | 3.8 | 3.9 | 3.7 | 3.5 | 2.7 |
| Mali: Bamako | 5.9 | 5.8 | 7.5 | 7.9 | 7.7 |

* < 20 cases.

Mantel-Hantzel chi-square tests showed that within each parity group[1], infants of mothers with no prenatal visits were less likely to survive until the mother's discharge from the hospital than infants of women who had some visits ($p < .005$). Also, within parity groups, survival of the fetus was positively associated with increased antenatal visits.[2]

Prenatal care can also be expected to reduce the number of delivery complications. Figure 3 shows this relationship again for the women delivering at Korle-Bu Hospital. The beneficial effect of prenatal care is clearly seen among the grandmultiparae, where 40% of the women with no prenatal care

In this report, primiparae are women with no live births prior to the current hospitalization, multiparae are women with one to three live births prior to the current hospitalization and grandmultiparae are women with four or more live births prior to the current hospitalization.

To test for whether or not increasing the number of antenatal visits was associated with fewer fetal deaths, a linear model was fit to the proportion of women with fetal deaths. Tests of the model showed that although there were differences among the parity groups, as evidenced by significantly different intercepts, the model fit the data well (the p value for the Wald goodness-of-fit statistic was 0.82).

experienced some kind of complication of labor or delivery compared with 24% of the women with seven or more visits. However, among both the primiparae and the multiparae there is no consistent relationship between prenatal care and complications of labor or delivery.

As discussed above, it could be argued that the positive relationship between prenatal care and survival is, at least in part, attributable to factors affecting the level of care. However, as shown in Table 2b, for women delivering at Korle-Bu, only those in the very highest education group make more antenatal visits than do women with less education. Moreover, controlling for the level of education, Figure 4 shows clearly that within education groups, prenatal care has a beneficial effect on the survival of the infant, with the percentage of infants alive at discharge positively associated with the number of prenatal visits. These data do not support the hypothesis that the impact of prenatal care on infant survival is due to the effect of mother's education; hence, the influence of prenatal care is a real one.

Finally, Figure 5 shows the relationship between prenatal care and the presence of pathological prenatal conditions. There is a positive association of recorded conditions with increased prenatal care. This can be interpreted in two ways: (1) The more contact a woman has with the health care system, the more opportunity there is for her problems to be diagnosed. Women with no contact have no opportunity to be diagnosed. (2) Women with problems will require additional care and, therefore, make more prenatal visits. The former

**Figure 3. Percent of Women With No Recorded Complication of Labor and Delivery, by Parity and Number of Antenatal Visits, Accra, Ghana**

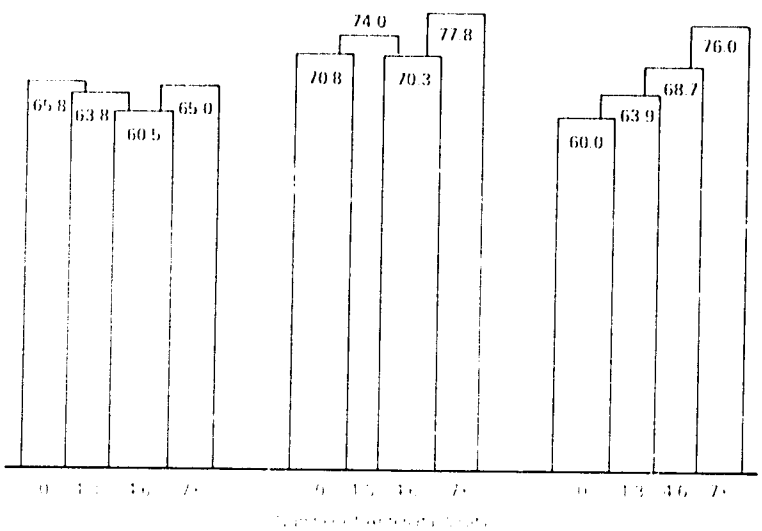
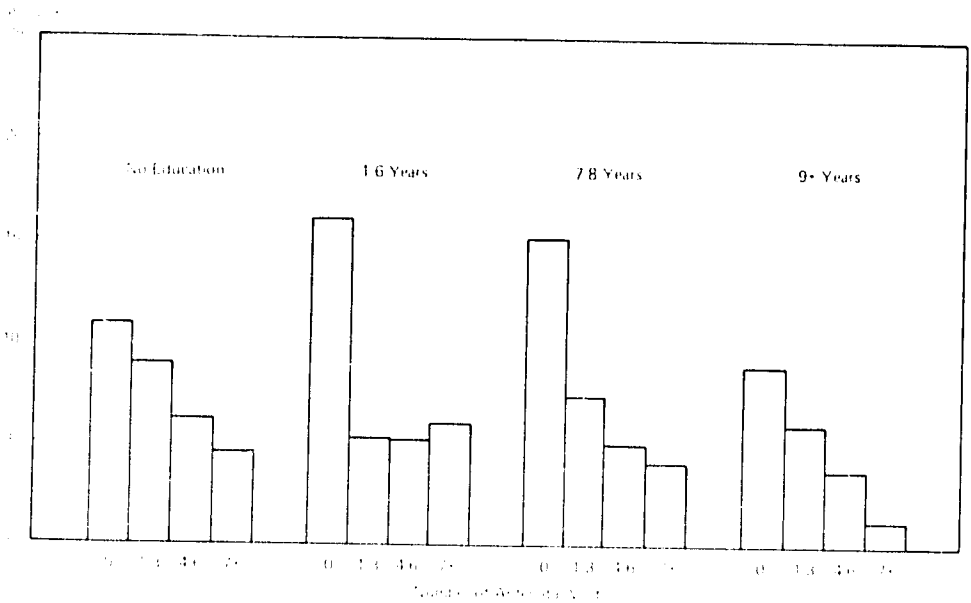


**Figure 4. Percent of Infants Dying Before Mother's Discharge from Hospital, by Education and Number of Antenatal Visits, Accra, Ghana**




appears to be the more likely explanation in this case. If the latter were true, we would also expect to find poorer pregnancy outcomes for women with more prenatal visits, which is demonstrated not to be the case (Figure 2). Thus, the measurement of the extent of prenatal pathological conditions should be regarded with extreme caution in Korle-Bu Hospital, and probably in other centers in Africa as well.

## B. Obstetric Practices

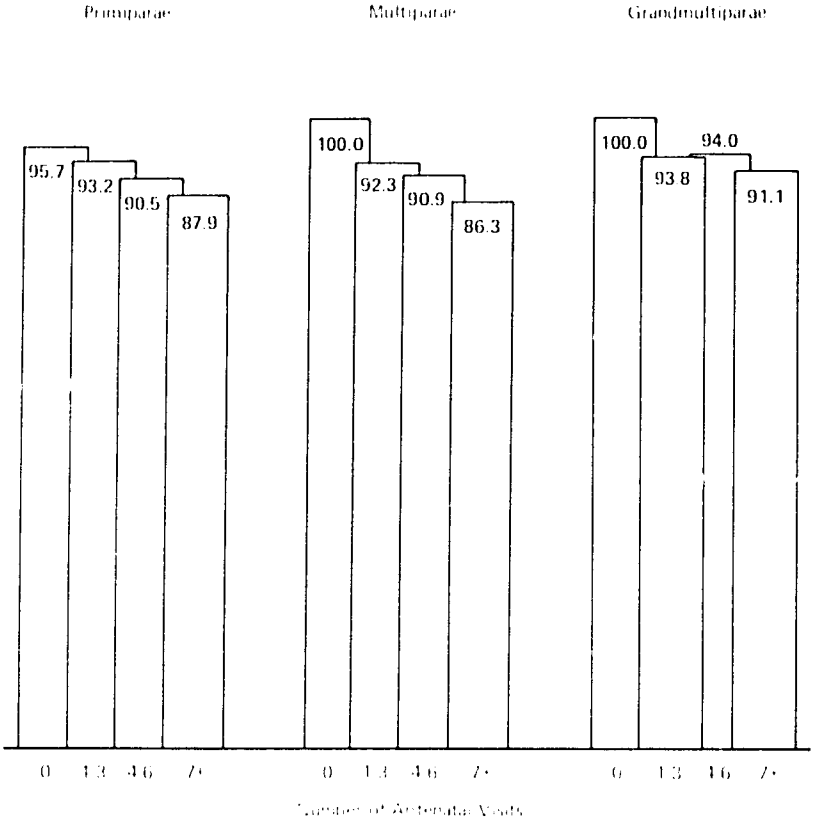
1. *Obstructed Labor and Symphysiotomy*

Obstructed labor is defined as the failure of descent of the fetus in the birth canal for mechanical reasons in spite of good uterine contractions. It can be caused by malpresentation of the fetus during labor, feto-pelvic disproportion, or various other less common conditions. Untreated obstructed labor can result in numerous physical complications, including tissue necrosis and uterine rupture, intrapartum fetal death and subsequent infertility (Philpott, 1980). Feto-pelvic disproportions, due mainly to small or abnormally formed pelvises, are quite prevalent in African women and are a primary cause of the high incidence of obstructed labor (Ojo and Briggs, 1982).

Management of obstructed labor depends on the cause of the condition and the circumstances of the patient. If the disproportion is due to a vertex malpresentation, a forceps or vacuum extraction may be used to deliver the infant. If the baby is dead, an embryotomy is often carried out; if it is alive, the procedure may be either a cesarean section or a symphysiotomy.

Symphysiotomy is a surgical division of the pelvic joint performed to increase the capacity of a contracted pelvis sufficiently to permit the passage of a living child (Williams, 1980). The procedure was first performed in 1777, but the operation fell into disrepute and was performed only sporadically until

**Figure 5. Percent of Women With No Recorded Antenatal Condition, by Parity and Number of Antenatal Visits, Accra, Ghana**




1858. Its popularity increased in the latter half of the nineteenth century, and symphysiotomy was the main topic of discussion at three medical meetings in the 1890s, including one in the United States.

Studies comparing symphysiotomy with cesarean section (Williams, 1908) showed that for symphysiotomy, maternal mortality was equal to or higher than for cesarean section, and fetal mortality was much lower for cesarean section. Moreover, convalescence was much more rapid with cesarean section.

By 1905, only a very few well-known obstetricians were still performing symphysiotomies in the United States. The decline in interest in symphysiotomy is illustrated in a later edition of Williams (1966), which devoted only one paragraph to symphysiotomy compared to over four pages in the earlier edition. Reasons for abandoning the procedure in the United States included high incidence of bladder injuries, interference with subsequent locomotion, hemorrhage and the increasing safety of modern cesarean section.

Africa is among the places where symphysiotomies are still performed. In many African settings, it is almost impossible to follow a woman through her subsequent pregnancies. If a woman is delivered by cesarean section, she is at

increased risk of dying with a ruptured uterus in her next pregnancy if she does not receive adequate medical care. For cases of mild cephalopelvic disproportion, symphysiotomy may be a preferable alternative, as it may permanently enlarge the pelvis sufficiently to allow for subsequent vaginal deliveries (Rendle-Short, 1961).

Recent data, however, raise some further questions about the most appropriate management of obstructed labor in the African setting. Data reported in this volume, as well as in other studies, show that the risk of uterine rupture of women with previous cesarean deliveries may be less than previously thought. It is also not clear to what extent women with previous symphysiotomies require surgical intervention in subsequent deliveries. The relative risks and advantages of these two interventions must be carefully evaluated, especially for an area where medical care for subsequent deliveries may be unsought or unavailable. Women may not return to the hospital for future deliveries or may wait many hours (or days) after the onset of labor to return.

2. *Obstructed Labor and Symphysiotomy in Karawa, Zaire (Table 3)*

Nearly 18% (319) of the obstetric patients presenting at a hospital in rural Zaire were diagnosed as having abnormal or contracted pelvises or, on admission for delivery, as having prolonged or obstructed labor. Such women were younger, on the average, than women without such problems and were far more likely to have suffered previous adverse reproductive outcomes (spontaneous abortions or stillbirths). About 20% of the women with obstructed labor were cretins as compared with 1% of the patients who did not have obstructed labor.[1] A greater proportion of the women with obstruction had not received antenatal care.

Approximately 15% of the patients with obstructed labor had premature rupture of the membranes as compared to 3% of those without this complication. Because of the greater risk of infection associated with premature rupture of the membranes, women with obstructed labor were often at risk of intrapartum infection. They also suffered more often from malpresentation during labor, specifically transverse presentations and vertex malpresentations.

Mortality among women with obstructed labor was much higher than for those without this complication. There were eleven maternal mortalities among the 319 patients with obstruction compared to only one among women without obstructed labor. The perinatal mortality rate was 187.1 in the former group compared with 53.3 in the latter group. Morbidity was also higher for cases of obstructed labor. One third of the obstructed women suffered from postpartum fever requiring treatment, and one fourth of the infants born to these women suffered distress during labor. For the cases without obstruction, these outcomes were far less frequent: 6% of mothers had fever requiring treatment, and 5% of the infants had fetal distress.

Nearly half (46%) of the 319 women with obstructed labor were delivered by cesarean section, 22% received a symphysiotomy, 9% were assisted by vacuum extraction and 3% had an embryotomy (Table 3). Fourteen percent of the women had spontaneous unassisted deliveries (compared to 92% of the

[1] This is an area of Zaire characterized by iodine insufficiency resulting in endemic goiter, with high incidence of cretinism.

**Table 3. Characteristics and Outcome for Patients with Obstructed Labor,* by Type of Delivery, Karawa Christian Missionary Hospital, Zaire**

| | Spontaneous Expulsion | Vacuum Extraction | Symphysiotomy | Cesarean Section |
|---|---|---|---|---|
| Number of cases | 46 | 28 | 70 | 148 |
| % of patients who were cretin | 4.4 | 3.6 | 14.3 | 31.8 |
| % with antenatal diagnosis of feto-pelvic disproportion | 32.6 | 18.5 | 43.3 | 59.8 |
| % with malpresentation during labor | 8.7 | 10.7 | 15.7 | 39.2 |
| (vertex) | (4.4) | (10.7) | (11.4) | (32.0) |
| (breech) | (4.4) | (0.0) | (4.3) | (3.4) |
| (transverse, compound) | (0.0) | (0.0) | (0.0) | (4.1) |
| % with fetal distress | 19.6 | 28.6 | 24.3 | 20.9 |
| % with puerperal problem | 21.7 | 14.3 | 38.6 | 58.1 |
| Stillbirth rate† | 62.5 | 35.7 | 42.3 | 53.3 |
| Neonatal mortality rate† | 66.7 | 148.2 | 73.5 | 49.3 |
| Perinatal mortality rate† | 125.0 | 178.2 | 112.7 | 100.0 |

*Twenty-six women with obstructed labor who were delivered by other methods (hysterectomy, forceps or version extraction, or destructive procedures) are not included in this table.

†Information on maternal and child mortality collected in the maternity care monitoring program is available only up until the time of hospital discharge. Consequently, these data cannot be used to calculate standard mortality rates. Since hospitalizations are relatively short, rates presented here based on MCM data are lower than the standard rates. MCM-based rates are calculated as the number of deaths per 1000 live births prior to discharge.

women with no obstruction), and 5% were delivered by some other method (hysterectomy, forceps or version extraction.) There was a large number of cases of uterine rupture: approximately 5% of the women with obstructed labor. Nearly all of these cases were delivered by laparotomy followed by hysterectomy.

Puerperal problems, mainly fever requiring treatment, were more common in the women delivered by operative methods (58% of the cesarean deliveries and 39% of the symphysiotomies compared to 14% of the vacuum extractions and 22% of the spontaneous deliveries). However, the reasons for the postpartum fever are not known, and, as women were not followed up after discharge from the hospital, it is not possible to determine the long-term consequences of the various methods of delivery. The perinatal mortality rate did not differ widely among the four delivery types. There was one maternal death reported, a 20-year-old multipara with hypertension resulting from pregnancy. She had a previous cesarean section and suffered from feto-pelvic disproportion. The patient died of cardiorespiratory arrest after spinal anesthesia administered during a cesarean section.

A careful study is needed to follow up women who have had surgical interventions to determine the incidence of delivery problems and long-term morbidity. Of particular importance is information on the following:

1. incidence of obstructed labor, uterine rupture or other delivery problems for women with previous cesarean deliveries;

2. incidence of obstructed labor and other delivery problems for women with previous symphysiotomies; and
3. the documentation of immediate and long-term morbidity associated with these surgical interventions.

Such information will allow comparisons of the relative risks of cesarean section and symphysiotomy to enable physicians to make appropriate management decisions for women with obstructed labors.

### C. Maternal Mortality

Maternal mortality is suspected to be high throughout most of Africa, but in the absence of good vital registration this is difficult to assess. It can be argued that hospital-based statistics (as are reported here) underestimate maternal mortality, because they represent the minority of women in African countries who deliver with benefit of medical care. On the other hand, it may be argued that they are too high, because women delivering in hospitals have a higher than normal incidence of complications.

Estimates from comparable populations are difficult to obtain, since it is generally true that where mortality is high, vital registration is poor; and where registration is good, mortality is usually low. Nevertheless, a few estimates of maternal mortality have been made from survey data from developing countries. In the early 1960s, maternal mortality (excluding abortion) in Santiago, Chile; Cali, Colombia and Lima, Peru was estimated to be 1.5, 1.3 and 1.3, respectively, per 1000 live births (Puffer and Griffith, 1967). These estimates are considered to be reliable. Among the estimates available for Africa are 1.3 (Cape Verde, 1975), 2.0 (Kenya, 1970), 1.0 (Mauritius, 1979), and 1.5 (South Africa, colored population, 1971) (United Nations, 1980). It is not clear, however, whether these rates include deaths due to abortion. The maternal mortality rate in the United States in 1978 was 0.1 per 1000 live births (United Nations, 1980).

Data gathered with the Maternity Record show a wide range of mortality rates among hospitals (Table 4). Due to the rather small number of cases in some hospitals, the rates may be misleading. There are various explanations for the differences in maternal mortality rates among the studies. As mentioned elsewhere, several of the centers are referral hospitals with a concentration of complicated cases, whereas others do not have the resources to treat complications and send serious cases to other hospitals. In some centers, moribund cases are simply not admitted. Overall, the population served by each center, the resources available in the center to treat its population, and the data recording practices of the center affect the observed mortality rates.

A look at maternal mortality at the Maternite Abass N'Dao in Dakar, Senegal is enlightening. Of the patients admitted for delivery during the 12-month study period, 32 died before discharge from the hospital. There were more maternal deaths reported at this one hospital in the 12-month study period than were reported in all of Canada in 1979 (United Nations, 1980). An additional five women who had delivered outside and had been referred for puerperal complications died in the hospital.

The rate of maternal mortality (Table 4) is lower than that given by other sources of 8/1000 for Le Dantec Hospital in Dakar and 5/1000 in the entire Cape Vert region including Dakar (Adanlete, 1977).

The group of women admitted for delivery who died was, on the average, older (31.4 years), of higher parity (3.8 live births), and had less education (93%

with no education) than the women who survived (25.3 years, 2.7 live births and 74% with no education, respectively). Nonsurviving women had more extreme pregnancy intervals than surviving women (16% compared to 6% with less than one year and 21% compared to 5% with more than four years). An equal proportion of women in each group had previously been pregnant, but women who died were more likely to have had an unfavorable pregnancy outcome for their last pregnancy (eg, infant death, stillbirth or spontaneous abortion). Only 59% of the multiparae who died had an infant surviving from their last pregnancy, while 85% of the survivors' babies were still alive at the time of the present delivery.

Hypertensive disorders (preeclampsia and eclampsia) were reported as a primary antenatal condition for 27% of the patients who died as compared to 4% of the patients who survived. More than one fourth of the women who were recorded as eclamptic died before being discharged from the hospital. Hemorrhage and anemia were also more often reported for the women who died. Ninety-four percent of the patients who died were reported to have had an antenatal problem, while fewer than 10% of the survivors had a problem reported. A very frequent comment on the death reports was that the women had not been adequately supervised during their pregnancy and had waited too long before arriving at the hospital for delivery.

Of the 32 women who died after being admitted for delivery, eleven died before they could deliver. The 21 women who did deliver before dying were more likely than the surviving women to have had a breech presentation during labor (12% compared to 3%) and to have had some other complication of labor or delivery (78% compared to 5%). The most commonly specified complications for the women who died were placenta abruptio (33%), hemorrhage (11%), prolonged or obstructed labor (7%) and hypertonic uterine contractions (4%). Various other complications were all related to insufficient prenatal monitoring and difficult access to health facilities. The women who

**Table 4. Maternal Mortality in Selected Hospitals**

| Location of Hospital | Number of Cases | Number of Reported Deaths | Rate* |
|---|---|---|---|
| Ghana: Accra | 4990 | 11 | 2.3 |
| Mali: Bamako** | 8750 | 1 | 0.1 |
| Nigeria: Benin City | 3033 | 5 | 1.6 |
| Rwanda: Gisenyi | 4066 | 0 | 0.0 |
| Senegal: Dakar** | 10730 | 37 | 3.5 |
| Sierra Leone: Freetown*** | 5788 | 8 | 1.4 |
| Sudan: Khartoum North | 2399 | 2 | 0.9 |
| Omdurman | 1552 | 2 | 1.4 |
| Wad Medani | 1540 | 9 | 6.0 |
| Tanzania: Moshi | 1956 | 5 | 2.6 |
| Mwanza | 3986 | 9 | 2.3 |
| Zaire: Karawa | 1790 | 10 | 6.0 |

*Maternal deaths per 1000 live births prior to discharge from the hospital.
**Includes some deliveries outside the hospital.
***Excludes patients with more serious complications.

died were also more likely to have had a cesarean section or some other type of non-spontaneous delivery (12% compared to 3%).

Infants born to women who died weighed almost 225 grams less than those whose mothers survived. Of course, all of the undelivered infants died as well as 71% of the infants whose mothers died after delivery, compared to only 4% of those infants born to surviving women.

### D. Allocation of Medical Resources and Obstetric Care

Although there are a few well-staffed and well-equipped maternity facilities in Africa, the majority do not fit this description. Most maternity centers have only rudimentary facilities, and some have no physicians among their staff. Hospital personnel are chronically overworked, and patient loads rise yearly. The availability of a physician significantly influences the number of cesarean sections and other operative interventions. Table 5 shows the relationship between the percentage of physician-attended deliveries and the percentage of deliveries by cesarean section in several hospitals participating in Maternity Record studies. While physician availability may be critical for managing high risk pregnancies, it may not affect the quality of care in uncomplicated cases.

In addition to the short supply of physicians, other factors contribute to a low rate of abdominal deliveries; these are not unique to Africa, but are, perhaps, found there to a greater degree.

1. Neonatal intensive care facilities are minimal, so that a premature or otherwise jeopardized infant has a poor chance of survival.
2. While the maternal risks associated with cesarean section have been much reduced in developed countries, in many developing countries, including most of Africa, there continue to be significant risks associated with cesarean section as with other major abdominal surgery.
3. A woman who delivers abdominally may not return to the hospital to have her next baby, thus running the risk of a future uterine rupture. A cesarean section therefore jeopardizes her life not only during the present delivery but also during the next delivery (as was discussed in a previous section).
4. Standard resources used in cesarean deliveries (anesthesia, blood for transfusions, antibiotics) are often in short supply or unavailable.

These four factors combine to make physicians understandably reluctant to perform a cesarean section except when necessary to preserve the mother's life or health. In many instances, limited resources make even the most conservative use of cesarean section impossible, resulting in higher rates of maternal death.

In this section, we will consider how the shortage of health resources in developing countries affects women who deliver vaginally with symptoms that in developed countries would be considered indications for cesarean section. The subjects of analysis are women with a previous cesarean section (maternal indication for cesarean section) and women with a breech presentation (fetal indication for cesarean section).[4] Given the realities of resource limitations,

[4] These two situations are not mutually exclusive; there are six women with both indications who are included in both analyses. All six deliveries were managed by obstetricians/gynecologists. None of these women reported serious antenatal conditions or complications of labor or delivery; there were no maternal or fetal deaths and no low (< 2500 grams) birth-weight babies. In this light, it is interesting to note that two of these women delivered vaginally and thus serve to emphasize the findings of this section.

**Table 5. Association Between the Percentage of Deliveries Attended by a Physician and the Percentage of Deliveries by Cesarean Section**

| Center | Percentage of deliveries by cesarean section | Percentage of deliveries attended by a physician |
|---|---|---|
| Mali: Bamako* | 0.0 | 0.0 |
| Rwanda: Gisenyi | 0.0 | 0.0 |
| Senegal: Dakar* | 1.6 | 2.4 |
| Sierra Leone: Freetown** | 2.1 | 3.1 |
| Tanzania: Mwanza | 2.4 | 3.4 |
| Ghana: Accra | 5.2 | 12.7 |
| Tanzania: Tarime | 5.3 | 6.1 |
| Tanzania: Moshi | 8.7 | 20.8 |
| Zaire: Karawa | 11.1 | 21.2 |
| Sudan: Khartoum North | 11.5 | 42.4 |
| Nigeria: Benin City | 12.5 | 17.9 |
| Sudan: Wad Medani | 12.5 | 19.1 |
| Sudan: Omdurman | 17.1 | 17.2 |
| Ivory Coast: Abidjan | 23.4 | 33.2 |

*Includes some deliveries outside the hospital.
**Excludes patients with more serious complications

important questions are: 1) whether women for whom cesarean section may have been the preferred delivery method in a setting with better resources can have safe vaginal deliveries, and 2) whether non-physicians can manage these deliveries without unduly compromising the health of the mother and infant.

1. *Management of Women With Previous Cesarean Deliveries*

Table 6 presents information on potential indications for cesarean section and cesarean section rates for women with previous abdominal deliveries. Table 7 presents a comparison of resource use and outcome for the mother and child, according to the type of delivery, for women who had had previous cesarean sections and a control group of women who had vaginal deliveries but no previous cesarean section. Data were provided by the University of Benin Teaching Hospital in Nigeria. Of the 224 women who reported having had at least one previous cesarean section, 47% had a vaginal delivery for the current pregnancy. In contrast, in the United States virtually all women with a previous cesarean section have a repeat section, although recently more hospitals are allowing women a trial of labor.

Before discussing how the potential indicators for cesarean section affect the rate of cesarean section, it is important to note that almost all women (96%) delivering at the Benin City center had had some antenatal care, and 57% had made eight or more antenatal visits. Furthermore, all but 6% of all women were scheduled in advance for hospital delivery. The same proportions apply to the sub-sample of 224 women with previous cesarean sections. The high percentage of women with antenatal visits afforded opportunities to diagnose existing problems and make judgments about potential complications before the time of delivery. The vast majority of women planned to have their babies in hospital rather than being admitted as emergency cases with no previous contact with medical personnel.

Table 6 shows that the majority of women had no diagnosed antenatal problems (84%) or problems of labor (84%). However, women who had at least one of these problems were much more likely to have cesarean deliveries. For example, all women with feto-pelvic disproportion were delivered abdominally. Among women who experienced labor complications, 89% had abdominal deliveries, as did 83% of those with fetal distress and 78% of those with noncephalic presentations. There was some association between estimated gestation and the cesarean rate; slightly more than a third of the women with reported gestations between 32 and 36 weeks were delivered by cesarean compared with over half of those with longer reported gestations. There was no association between birth weight and type of delivery. However, very few short-gestation or low-birth-weight infants were reported.

No question on the Maternity Record asks whether a cesarean was scheduled in advance, but it may be surmised that the 28% of women with no labor had a scheduled procedure. Among the 75% who experienced labor, some may have been scheduled for cesarean delivery but went into labor before the planned date of surgery. About one quarter of the women who had one to twelve hours of labor delivered by cesarean section, compared with 70% of those who had more than 12 hours of labor.

Table 7 shows the implications for maternal and fetal outcome when women with previous cesareans do not have repeat sections routinely. One might expect that women with repeat cesareans would have somewhat poorer outcomes than those who delivered vaginally, given the higher rates of antenatal problems and complications of labor for women who had repeat cesareans. The risks associated with the surgery itself add further to the overall risks for women with repeat cesarean deliveries. The last column of Table 7 shows outcome information for a control group of comparable women having vaginal deliveries and no previous cesarean deliveries.

There were no maternal deaths among women with previous cesareans having vaginal deliveries, one death in the repeat cesarean group, and two in the control group. Women in the repeat cesarean group were, not surprisingly, significantly more likely to have had a puerperal problem than women in either of the other groups. If a previous cesarean section were a serious risk factor for otherwise uncomplicated deliveries, one would expect that the women in column 2 would have significantly poorer outcomes and require more resources than the controls. However, there were no significant differences between those women with vaginal deliveries after a previous cesarean and the control group.[5] While the risk of uterine rupture is often cited as one of the most important reasons for doing repeat cesarean sections, no woman who delivered vaginally after a previous cesarean was reported to have a uterine rupture.

The highest percentage (6.3%) of low-birth-weight babies was in the control group, while women having repeat cesareans had the highest percentage of babies weighing in excess of 3500 grams. The fetal death rate was 44 per thousand among the controls, 38 among women with vaginal deliveries following a previous cesarean, and 34 among women with repeat cesareans; however, these differences were not statistically significant.[6]

[5]Chi square $p > .05$.
[6]Chi square $p > .05$.

## Table 6. Potential Indications for Cesarean Section and Cesarean Section Rates, All Women Who Had at Least One Previous Cesarean Section (singleton deliveries), Benin City, Nigeria

| | Total (N = 224) | % delivered by cesarean section | |
|---|---|---|---|
| *Potential indications for a cesarean section (percent distribution)* | | | |
| Antenatal problems | | | |
| None | 83.5 | 49.2 | (187) |
| Feto-pelvic disproportions | 5.8 | 100.0 | (13) |
| Hypertensive disorders | 3.1 | | |
| Hemorrhage | 1.3 | 58.3 | (24) |
| Other | 6.3 | | |
| Total | 100.0 | | |
| Estimated gestation | | | |
| <32 weeks | 0.0 | | |
| 32-36 weeks | 5.8 | 38.5 | (13) |
| 37-42 weeks | 94.2 | 53.8 | (210) |
| 43+ weeks | 0.0 | | |
| Total | 100.0 | | |
| Birth weight | | | |
| <2500 gms | 1.4 | 66.7 | (3) |
| 2500-3499 gms | 57.5 | 49.2 | (126) |
| 3500 gms+ | 41.1 | 55.6 | (90) |
| Total | 100.0 | | |
| Type of presentation | | | |
| Cephalic | 96.0 | 52.3 | (214) |
| Other | 4.0 | 77.8 | (9) |
| Total | 100.0 | | |
| Complications of labor | | | |
| None | 83.9 | 46.3 | (188) |
| Prolonged/obstructed labor | 11.6 | | |
| Hypotonic uterine contractions | 3.1 | 88.9 | (36) |
| Hypertonic uterine contractions | 0.4 | | |
| Hemorrhage | 0.9 | | |
| Total | 100.0 | | |
| Duration of labor | | | |
| No labor | 28.4 | 100.0 | (63) |
| 1-12 hours | 56.8 | 26.1 | (126) |
| 13-18 hours | 11.3 | | |
| 19+ hours | 3.6 | 69.7 | (33) |
| Total | 100.0 | | |
| Fetal distress | | | |
| Yes | 8.0 | 83.3 | (18) |
| No | 92.0 | 50.5 | (206) |
| Total | 100.0 | | |
| All women | | 53.0 | (224) |

## Table 7. Outcome and Resource Use by Type of Current Delivery (singleton deliveries), Benin City, Nigeria

| | Women Who Had at Least One Previous Cesarean Section | | |
|---|---|---|---|
| | Type of Current Delivery | | |
| | Cesarean (N = 119) | Vaginal (N = 105) | Controls* (N = 2108) |
| I. *Outcome (percent distribution)* | | | |
| Maternal death | 0.8 | 0.0 | 0.1 |
| Puerperal problem | 7.6 | 1.0 | 2.1 |
| Fetal death | | | |
| None | 96.6 | 95.1 | 95.5 |
| Antepartum | 1.7 | 1.9 | 1.9 |
| Intrapartum | 1.7 | 1.0 | 0.5 |
| Postpartum | 0.0 | 1.0 | 2.0 |
| Total | 100.0 | 100.0 | 100.0 |
| Birth weight | | | |
| <2500 gms | 1.8 | 1.0 | 6.3 |
| 2500-3499 gms | 54.4 | 61.0 | 58.6 |
| 3500 gms+ | 43.9 | 38.1 | 35.1 |
| Total | 100.0 | 100.0 | 100.0 |
| II. *Resource Use (percent distribution)* | | | |
| Attendant at delivery | | | |
| Midwife | 0.0 | 91.4 | 94.2 |
| Ob Gyn | 100.0 | 8.6 | 4.8 |
| Other | 0.0 | 0.0 | 0.0 |
| Total | 100.0 | 100.0 | 100.0 |
| Anesthetic | | | |
| None | 0.0 | 71.4 | 76.6 |
| Analgesic | 0.8 | 5.7 | 7.0 |
| Local | 0.0 | 15.2 | 13.5 |
| General | 98.3 | 0.0 | 0.2 |
| Combination | 0.8 | 7.6 | 2.5 |
| Other | 0.0 | 0.0 | 0.1 |
| Total | 100.0 | 100.0 | 100.0 |
| Receiving a blood transfusion | 14.3 | 1.9 | 1.9 |
| Nights hospitalized before delivery | | | |
| 0-1 | 68.1 | 96.2 | 96.0 |
| 2-7 | 29.4 | 1.9 | 2.2 |
| 8+ | 2.5 | 1.9 | 1.7 |
| Total | 100.0 | 100.0 | 100.0 |
| Nights hospitalized after delivery | | | |
| 0-1 | 0.0 | 1.9 | 1.8 |
| 2-7 | 0.8 | 95.2 | 93.3 |
| 8+ | 99.2 | 2.9 | 4.9 |
| Total | 100.0 | 100.0 | 100.0 |

*Women were selected as controls if they had at least one previous live birth, if they had no previous cesarean sections and if their current delivery was vaginal.

The second part of Table 7 shows the resources used in providing care for each of the three groups. Obviously, all women having repeat cesareans were attended by physicians and required more of all types of resources than women with vaginal deliveries. Among the two groups of women having vaginal deliveries, there were no statistically significant differences in resource use.[7]

While clinicians must evaluate for each individual case whether or not to perform a repeat cesarean, these data clearly indicate that for women who have opportunities to have problems diagnosed antenatally, those with no problems or labor complications can have subsequent vaginal deliveries as safely as women with no previous cesarean deliveries. Where there are antenatal complications or labor-related problems, it may be more advantageous to perform a cesarean if the resources are available. The question of non-physician personnel attending vaginal deliveries of women with previous cesareans has a less clear answer, although the overwhelming majority of women in this study who delivered vaginally after a previous cesarean were safely attended by non-physicians.

2. *Management of Breech Presentations*

There were 89 women who had breech presentations during the study period at the Benin City University Teaching Hospital. Thirty-five, or 38.2%, of these women had a cesarean section, and the remaining women had vaginal deliveries, either spontaneous or spontaneous-assisted (Table 8). Seventy-seven percent of the women in the vaginal group and 80% in the cesarean group reported having at least one antenatal visit; hence, the percentage in each group having the opportunity to have antenatal problems diagnosed was similar.

Women with frank breeches (40%) and complete breeches (44%) were more likely to deliver abdominally than women with footling breeches (28%). Not surprisingly, women who had some antenatal problem or some complication of labor were more likely to be delivered abdominally than were women without problems. Also, women whose babies experienced fetal distress were more likely to be delivered abdominally than women whose infants were not diagnosed as distressed. Duration of labor was not associated with the cesarean section rate; however, only a small percentage of women were recorded as having long labors.

The proportion of women who had cesarean sections was positively associated with both the estimated length of gestation and with birth weight. While only 17% of infants weighing less than 2500 grams were delivered abdominally, 83% of infants weighing 3500 grams or more were delivered in this fashion.

These data show that women with breech presentations, like women with previous cesarean sections, were selected for cesarean deliveries if they had complications that could result in poor outcomes if delivered vaginally. The study also indicates that cesarean sections were often done as emergency procedures after serious problems with the labor had developed rather than as pre-scheduled procedures.

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[7]Chi square family alpha = .05

One woman in the cesarean group died, and another woman had bleeding requiring treatment (Table 9). No puerperal problems were reported in the vaginal group. Fetal outcomes varied greatly. A much higher percentage of babies in the vaginal group died (one third) as compared with the cesarean group (8.6%). Much of the difference in outcome may be attributed to the much higher percentage of low-birth-weight babies in the vaginal compared with the cesarean group. Table 10 shows that of the 19 babies weighing under 2500 grams who were delivered vaginally, 11 died. One baby out of four weighing less than 2500 grams in the cesarean group died. However, there were seven babies weighing 2500 grams or more delivered vaginally that died. In comparison, only two babies weighing 2500 grams or more in the cesarean group did not survive.

Of the three perinatal deaths in the cesarean group, one was antepartum, one was intrapartum, and the time of death for the last is unknown. Cesarean section in the case of the antepartum death seemed indicated by placenta previa occurring in conjunction with a frank breech presentation. Of the 18 perinatal deaths in the vaginal group, three were antepartum, three were intrapartum and the remaining 12 were postpartum. Eight of the 12 postpartum deaths weighed 2000 grams or less.

Women in the vaginal delivery group had shorter hospital stays, usually two to seven days as opposed to eight or more for women with a cesarean delivery. Almost one quarter of the women in the cesarean group had a blood transfusion compared with only 3.7% of the women in the vaginal group.

These results suggest that there might be fewer infant deaths if more of the breech presentations were to be delivered abdominally. Some of the very small babies, especially those weighing less than 1000 grams and probably some weighing 1500 to 2000 grams, would not survive no matter what type of delivery were performed. However, the survival chances of babies weighing more than 2500 grams might be improved if they were delivered by cesarean section. Given the limited resources such as highly trained medical personnel, it is unlikely that more cesarean sections would be performed in the absence of maternal indications. If more cesarean sections were to be performed, mothers would be subject to higher risks of morbidity and mortality, although their babies might have a better chance of survival. The very low rate of cesarean delivery for all but the very largest babies suggests that the risk to the mother, as well as the high cost of resources, is considered too great to warrant an abdominal delivery except where vaginal delivery would cause even greater problems to the mother. Thus, although some of the babies, particularly those in the middle of the weight range, might do better if delivered abdominally, the greater risks to the mother combined with limited resources apparently interact to keep cesarean section rates low. Antenatal care provides an opportunity to diagnose malpresentations as well as other potential complications. By such screening of women for high risk, more effective use can be made of limited resources, including physicians, surgical facilities, blood, oxygen, anesthesia, and antibiotics to manage those women most in need of these resources.

**Table 8. Potential Indications for Cesarean Section, All Women With Singleton Breech Presentations, Benin City, Nigeria**

| | % Distribution of Total | % delivered by cesarean section | |
|---|---|---|---|
| *Potential indications for a cesarean section (percent distribution)* | | | |
| Antenatal problems | | | |
| None | 76.1 | 32.8 | (67) |
| Hemorrhage | 12.5 | | |
| Hypertensive disorders | 3.4 | 61.9 | (21) |
| Other | 8.0 | | |
| Total | 100.0 | | |
| Estimated gestation | | | |
| <32 weeks | 7.8 | 0.0 | (7) |
| 32-36 weeks | 26.9 | 29.2 | (24) |
| 37-42 weeks | 62.9 | 48.2 | (56) |
| 43+ weeks | 2.2 | * | (2) |
| Total | 100.0 | | |
| Birth weight | | | |
| <2500 gms | 25.5 | 17.4 | (23) |
| 2500-3499 gms | 47.2 | 26.2 | (42) |
| 3500 gms+ | 27.0 | 83.3 | (24) |
| Total | 100.0 | | |
| Type of Presentation | | | |
| Frank breech | 41.6 | 40.5 | (37) |
| Footling breech | 20.2 | 27.8 | (18) |
| Complete breech | 38.2 | 44.1 | (34) |
| Total | 100.0 | | |
| Complications of labor | | | |
| None | 83.0 | 34.2 | (73) |
| Prolonged/obstructed labor | 9.1 | | |
| Hemorrhage | 5.7 | 66.7 | (15) |
| Placenta abruptio | 1.1 | | |
| Other | 1.1 | | |
| Total | 100.0 | | |
| Duration of labor | | | |
| No labor | 15.9 | 100.0 | (14) |
| 1-12 hours | 63.6 | 28.6 | (56) |
| 13-18 hours | 15.9 | | |
| 19+ hours | 4.5 | 27.8 | (18) |
| Total | 100.0 | | |
| Fetal distress | | | |
| Yes | 18.0 | 62.5 | (16) |
| No | 82.0 | 34.2 | (73) |
| Total | 100.0 | | |

*One of these cases was delivered by cesarean section.

**Table 9. Outcome and Resource Use by Type of Current Delivery, All Women With Singleton Breech Presentations, Benin City, Nigeria**

| | Type of Current Delivery | |
|---|---|---|
| | Cesarean (N = 35) | Vaginal (N = 54) |
| I. *Outcome (percent distribution)* | | |
| Maternal death | 2.9 | 0.0 |
| Puerperal problem | 5.7 | 0.0 |
| Fetal death | | |
| None | 91.4 | 66.7 |
| Antepartum | 5.7 | 5.6 |
| Intrapartum | 2.9 | 5.6 |
| Postpartum* | 0.0 | 22.2 |
| Total | 100.0 | 100.0 |
| Birth weight | | |
| <2500 gms | 11.4 | 35.2 |
| 2500-3499 gms | 31.4 | 57.4 |
| 3500 gms+ | 57.1 | 7.4 |
| Total | 100.0 | 100.0 |
| II. *Resource Use (percent distribution)* | | |
| Attendant at delivery | | |
| Midwife | 0.0 | 30.0 |
| Ob/Gyn | 100.0 | 69.2 |
| Total | 100.0 | 100.0 |
| Anesthetic | | |
| None | | 31.5 |
| Local | | 40.7 |
| General | 100.0 | 1.9 |
| Combination | | 14.8 |
| Other | | 11.1 |
| Total | 100.0 | 100.0 |
| Blood transfusion | 25.7 | 3.7 |
| Nights hospitalized before delivery | | |
| 0-1 | 85.7 | 92.6 |
| 2-7 | 8.6 | 5.6 |
| 8+ | 5.7 | 1.9 |
| Total | 100.0 | 100.0 |
| Nights hospitalized after delivery | | |
| 0-1 | 0.0 | 0.0 |
| 2-7 | 2.9 | 86.8 |
| 8+ | 97.1 | 13.2 |
| Total | 100.0 | 100.0 |

*Eight of these twelve postpartum deaths weighed less than 2000 grams and the other four were more than 2500 grams.

**Table 10. Fetal Outcomes by Type of Delivery and Birth Weight, All Women With Singleton Breech Presentations, Benin City, Nigeria**

| | No. Alive | No. Dead |
|---|---|---|
| Vaginal delivery | | |
| <2500 grams | 8 | 11 |
| ≥2500 grams | 28 | 7 |
| Cesarean delivery | | |
| <2500 grams | 3 | 1 |
| ≥2500 grams | 29 | 2 |

# BIRTH SPACING

## A. Family Size, Infant Mortality and Desire for Additional Children

The spacing of births in Africa is influenced by a number of factors, including cultural practices (such as prolonged breast-feeding and postpartum abstinence), abortion practices, and the use of modern and traditional contraceptives. Birth spacing practices as well as the generally high rates of fertility found in many sub-Saharan African countries are influenced in large part by infant and child mortality. This section examines in detail the relationship of birth spacing and family size to infant mortality and how this affects the practice of breast-feeding, abortion and contraceptive use.

### 1. *Family Size*

Women delivering at each of the 10 centers were characterized by high fertility. Mean parity (excluding the current delivery) ranged from 1.9 at Accra to 2.7 at three centers (Gisenyi, Dakar, and Moshi). The average number of previous births at most of the remaining centers was quite close to 2.5.

In Table 11, average parity for women aged 20 to 24, 30 to 34, and 40 and over is presented for each of the included centers. The pattern is clear and consistent: women in their early twenties were having a second or third child; those a decade older already had four to six previous births; and women approaching the end of their reproductive cycle were having, *on average*, an eighth or ninth birth.[8]

These findings provide an insight into childbearing in sub-Saharan Africa. A typical 32-year-old maternity patient at the Centre Hospitalier Municipal in Dakar was likely to be delivering her *sixth* child; a 44-year-old patient in the same ward, her *ninth*. At the Maternite de Nyundo in Gisenyi, 60% of the 30- to 34-year-olds delivering were having a sixth or higher order birth; among women in their 40s, 45%—almost half—were having a *tenth* or higher order birth.

The mortality rate among live births resulting from the last delivery ranged from 7% in Benin City, Nigeria and Moshi, Tanzania, to over 26% at Karawa in the north of Zaire.

### 2. *Desire for Additional Children*

The widespread desire for large families in Africa is strikingly reflected in the responses concerning the number of additional children wanted by women delivering in the various centers (Table 12). The available data indicate that the proportion of women who wish to have small families is exceptionally low. Only a small minority of women with three or four children wish to limit their fertility, and it is only after women have as many as eight surviving offspring that a substantial majority wish to curtail childbearing. At only one center (Moshi, Tanzania) did more than half of the women with between five and seven children — including the current delivery — say that they wanted no more children. At many of the centers, in fact, many women with eight or more living children still wished to have additional offspring.

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[8]It should be emphasized that these characteristics pertain only to women who have become pregnant and are delivering in a particular maternity center, and not to the overall age-specific population of a particular locality. The Maternity Record collects detailed information about selected women in a population; for representative data pertaining to all individuals in that population, a sample survey approach would be necessary.

**Table 11. Mean Parity Previous to the Current Delivery at Selected Ages**

| Location | 20-24 | 30-34 | 40+ | All ages | Last Pregnancy: % Surviving Among Live Births |
|---|---|---|---|---|---|
| Ghana: Accra | 0.6 | 3.6 | 7.4 | 1.9 | 92 |
| Mali: Bamako | 1.2 | 4.1 | 6.7 | 2.5 | 97 |
| Nigeria: Benin City | 1.2 | 4.3 | 6.5 | 2.6 | 93 |
| Rwanda: Gisenyi | 0.8 | 4.7 | 8.3 | 2.7 | 81 |
| Senegal: Dakar | 1.5 | 5.0 | 8.0 | 2.7 | 91 |
| Sierra Leone: Freetown | 1.6 | 5.2 | 7.8 | 2.2 | 81 |
| Sudan: Wad Medani | 0.6 | 3.8 | 6.7 | 2.3 | 91 |
| Tanzania: Moshi | 1.0 | 4.8 | 8.4 | 2.7 | 93 |
| Mwanza | 1.5 | 5.5 | 7.5 | 2.4 | 90 |
| Zaire: Karawa | 1.1 | 4.4 | 8.0 | 2.4 | 74 |

**Table 12. Desired Family Size: Percent Wanting No Additional Children, by Current Number of Surviving Children (including the current delivery)**

| Location | Surviving Children 0-2 | 3-4 | 5-7 | 8 or more |
|---|---|---|---|---|
| Ghana: Accra | 2 | 15 | 35 | 63 |
| Mali: Bamako | 2 | 6 | 22 | 61 |
| Nigeria: Benin City | 0 | 4 | 20 | 83 |
| Rwanda: Gisenyi | 1 | 8 | 29 | 66 |
| Senegal: Dakar | 2 | 7 | 25 | 74 |
| Sierra Leone: Freetown | 1 | 14 | 48 | 92 |
| Sudan: Wad Medani | 2 | 11 | 35 | 88 |
| Tanzania: Moshi | 2 | 21 | 57 | 94 |
| Mwanza | 2 | 4 | 6 | 30 |
| Zaire: Karawa | 6 | 9 | 28 | 68 |

Still, a substantial minority of women at parities lower than eight want no more children. Furthermore, it is likely (although not documented herein) that those who *do* want larger families wish to space their future pregnancies for the optimum health of mother and children.

3. *Family Size Intentions: Benin City, Nigeria*

In order to examine in some detail a number of the factors associated with future family size intentions, we have chosen to look at the desire for additional children among 3057 women delivering at the University of Benin Teaching Hospital in Benin City, Nigeria. The analysis is limited to currently married women and excludes 20 respondents who said they wanted more children but were unable to give a specific number. Although it is recognized that the survival status of the most recent pregnancy is highly associated with future fertility intentions (Janowitz and Nichols, 1980; 1983a), we have excluded women having other than a surviving live birth at this delivery because there are not enough cases to analyze the impact of survival of the current pregnancy on desire for additional children.

High family size is illustrated by the data presented in Table 13, in which the proportion desiring additional children and the mean number of additional children wanted are given for women with one to eight living children. Those desiring to terminate their future childbearing were rare or nonexistent until the number of living offspring exceeded four; it was not until there were *eight* children that a majority wished to curtail childbearing. Data on the mean number of additional children desired, however, imply a somewhat lower level of wanted fertility. As shown in the last column of Table 13, where the *current* number of children is added to the mean *additional* number desired, it appears that an average total family size of between five and six children was desired by women at the earlier stages of childbearing. Data for high parity women is less useful, since the procedure does not allow for women to express a desire for smaller families than they actually have.

**Table 13. Future Childbearing Intentions as Related to Current Family Size, Benin City, Nigeria**

| Living Children (incl. this delivery) | Number of Women | Percent Wanting No More Children | Mean Additional Children Desired | Mean Total Children Desired* |
|---|---|---|---|---|
| 1 | 676 | 0 | 3.9 | 4.9 |
| 2 | 556 | 0 | 3.1 | 5.1 |
| 3 | 462 | 2 | 2.5 | 5.5 |
| 4 | 466 | 6 | 2.1 | 6.1 |
| 5 | 362 | 16 | 1.6 | 6.6 |
| 6 | 291 | 19 | 1.5 | 7.5 |
| 7 | 126 | 33 | 1.0 | 8.0 |
| 8 | 78 | 79 | 0.3 | 8.3 |

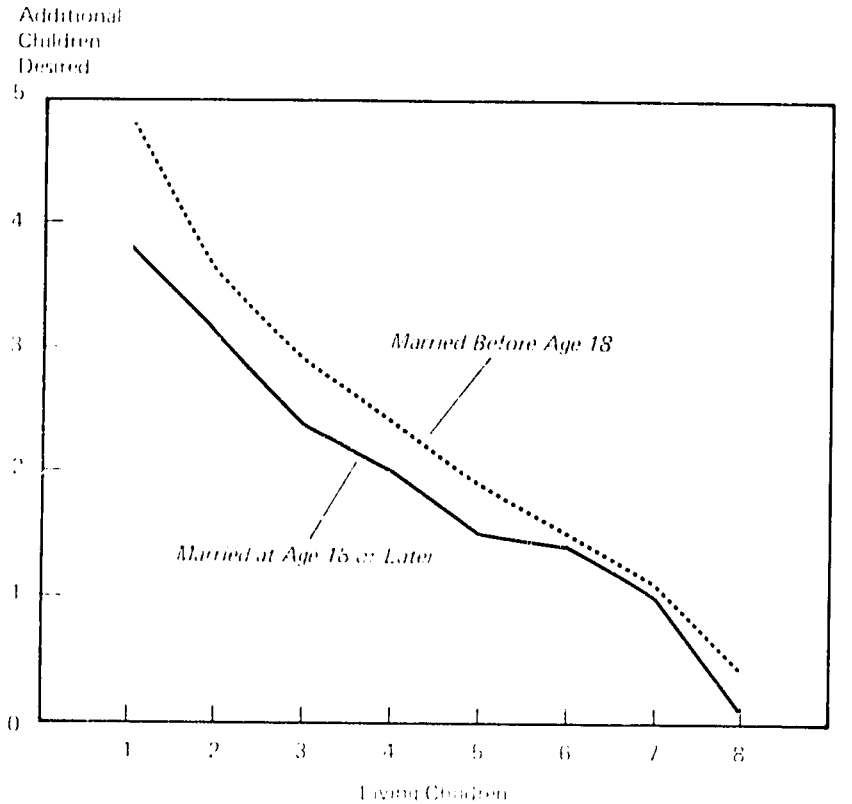
*Living children and mean additional children desired.

One fourth of the women in the study population were married before age 18. How do their family size expectations vary from women who married at an older age? Figure 6 shows that the difference is substantial, particularly at the onset of childbearing. Among women who had just delivered their first child, those marrying young desired an average of nearly one *more* additional child than those marrying at age 18 or later (4.7 vs 3.8). This differential declined to approximately 0.5 child for women with two to five living children, after which age at marriage was no longer a factor in family size desired.

We can similarly look at "parity"-specific* differences in desired fertility according to level of educational attainment (Figure 7). This particular data set is especially well suited for such an examination, as it contains a substantial number of women with high school and university experience—a consequence, in all likelihood, of the catchment area of a university teaching hospital in one of sub-Saharan Africa's most prosperous nations. One fifth of the study population had received education beyond the high school level, one third received 7 to 12 years of education, nearly two fifths attended school for one to six years, and only 10 percent had had no schooling.

*Here we modify our definition of parity to include only the women's number of *surviving* live births.

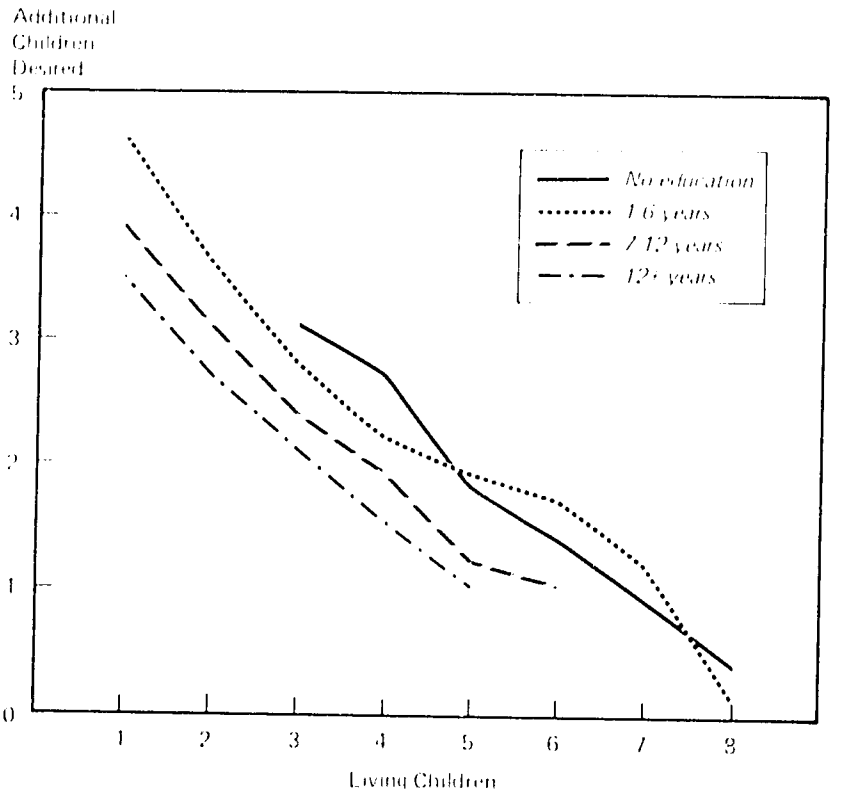
**Figure 6. Additional Children Desired by Number of Living Children and Age at Marriage, All Women With a Surviving Last Birth,* Benin City, Nigeria**




*Women who said they wanted more children but did not give a specific number were excluded.

Among women with four or fewer living children, Figure 7 shows that the average number of additional children wanted decreased almost linearly as educational attainment rose. The implications for total desired family size, however, are not great. For example, uneducated women with three living offspring wanted an average of 3.1 more children (for a total of 6.1), while those with some university experience and the same current family size desired only 2.1 more (for a total of 5.1). Those with primary and secondary education fell in intermediate positions between these extremes. When we look at the education-specific proportions of those who want no more children at each family size (Table 14), the different family size ideals for women in the four education groupings becomes apparent. Among women with less than six years of schooling, it was not until *eight* living children were reached that a majority reported that they wished to curtail childbearing. For women with high school and university experience, the corresponding family size was close to six and five living children, respectively.

**Figure 7. Additional Children Desired by Number of Living Children and Education, All Women With A Surviving Last Birth,* Benin City, Nigeria**




*Women who said they wanted more children but did not give a specific number were excluded.

**Table 14. Percentage Wanting No Additional Children, by Current Family Size and Level of Education, Benin City, Nigeria**

| Living Children | None | 1-6 yrs. | 7-12 yrs. | Over 12 yrs. |
|---|---|---|---|---|
| 1 | (0) | 0 | 0 | 0 |
| 2 | (0) | 0 | 0 | 0 |
| 3 | 5 | 1 | 1 | 3 |
| 4 | 0 | 5 | 8 | 13 |
| 5 | 12 | 7 | 28 | 46 |
| 6 | 26 | 9 | 42 | (67) |
| 7 | 35 | 22 | 57 | (80) |
| 8 | 73 | 93 | 70 | (100) |

( ) based on fewer than 20 cases.

The need to compensate for or "replace" children who have died is likely to be associated with reported differentials in desired fertility. According to the child survival hypothesis, improved survivorship among infants and children will contribute to a decline in fertility through increased motivation to use family planning. At any given parity, couples with nonsurviving offspring will desire more additional children (or pregnancies) than will those who have not experienced child loss. In addition, recent mortality experience should have a greater impact than earlier deaths, as subsequent pregnancies may have intervened to compensate for the latter.

Comparing the fertility desires of women with n living children and a surviving previous outcome with those with n-1 living children for whom the previous pregnancy resulted in a nonsurviving outcome shows that full replacement operates only when n=2 (Table 15). Here the difference in mean additional children wanted is 4.0 minus 3.1, or 0.9—roughly one more child. For n=3 to 5, the differential is reduced to approximately 0.5 child, and at higher numbers of living children the excess desired fertility of women experiencing recent child loss disappears altogether.

It is often suggested that the desire for additional children is a function of not only the current family size and aggregate survivorship but also the number of surviving *male* offspring. Son preference, whether for help with the family farm or business, for old-age security, or for the social prestige a father or mother accrues from having many sons, is felt to be a stumbling block to family planning programs in parts of Asia, Latin America and Moslem Africa. This was not the case in Benin City.

In Table 16, we present the mean number of additional children desired, according to the number of living children and living *sons*. At every family size, from one surviving child up through eight, the number of surviving sons had no impact on future fertility desires. Women who had just given birth to their first child wished to have, on average, 3.9 or more children *regardless of the* sex of that child. Similarly, women with three surviving children desired an average of 2.5 additional children; this figure remained constant for all combinations of sons and daughters. The absence of any relationship whatsoever is in itself striking. It may be that the pervasive desire for large families reduces the impact of sex preference to non-measurable levels; women who plan to raise eight or more children can be more sure of having two or three sons than can women whose family size expectations are for three or four children. Son preference may become a more important factor in the African context when desired family size declines.

### B. Pregnancy Intervals, Breast-feeding and Contraception

In urban areas of sub-Saharan Africa, traditional restraints on fertility, such as prolonged breast-feeding and postpartum sexual abstinence, are being abandoned. Declines in breast-feeding concern health authorities because infant nutrition is impaired and because modern contraceptives are not being substituted quickly enough to make up for the loss of the contraceptive effects of prolonged breast-feeding. Shorter intervals between pregnancies lead to higher fertility and the associated problems of poor maternal and child health (Makinwa-Adebusoye et al, 1982).

The purpose of this section is to examine the relative roles of breast-feeding and contraceptive use on the length of the last birth interval. The birth interval

**Table 15. Additional Children Wanted According to the Number of Living Children and Outcome of the Penultimate Pregnancy, All Women With a Surviving Last Birth, Benin City, Nigeria**

| Living Children* | Outcome of Previous Pregnancy | |
|---|---|---|
| | Surviving | Not Surviving |
| 2 | 3.1 | 4.0 |
| 3 | 2.5 | 3.1 |
| 4 | 2.1 | 2.6 |
| 5 | 1.6 | 2.1 |
| 6 | 1.5 | 1.7 |
| 7 | 1.0 | 1.3 |
| 8 | 0.3 | 1.0 |

*Excludes the penultimate pregnancy and includes the current delivery.

**Table 16. Additional Children Wanted According to the Number of Living Children and Living Sons, Benin City, Nigeria**

| Living Children | Living Sons | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 1 | 3.9 | 3.9 | | | | | | | |
| 2 | 2.9 | 3.2 | 3.2 | | | | | | |
| 3 | 2.5 | 2.5 | 2.5 | 2.5 | | | | | |
| 4 | (2.2) | 2.0 | 2.1 | 2.2 | (2.1) | | | | |
| 5 | (1.0) | 1.7 | 1.7 | 1.7 | 1.5 | (1.1) | | | |
| 6 | (1.5) | (1.3) | 1.5 | 1.5 | 1.4 | (1.5) | (1.4) | | |
| 7 | — | (0.8) | 0.8 | 1.0 | 1.2 | (1.0) | (1.2) | — | |
| 8 | — | (1.5) | (0.5) | (0.0) | 0.3 | 0.1 | (0.8) | (0.0) | — |

( ) based on fewer than 20 cases.

is defined as the period in months from the penultimate birth to the date of the current delivery. This analysis is restricted to women whose penultimate pregnancy resulted in a surviving live birth in order to control for the differential effects of mortality on both the length of the birth interval and the duration of breast-feeding. We recognize nonetheless that women with nonsurviving outcomes, including spontaneous and induced abortions, stillbirths and early child deaths, will have shorter intervals both because the period of postpartum amenorrhea will be shorter and because the motivation to have an additional child will be stronger (except for women with an induced abortion) (Janowitz and Nichols, 1983a, 1983b).

1. *Mean Birth Interval*

Figure 8 shows in descending order the mean birth interval in months for women with a surviving last birth for ten centers in nine African countries. Although there is a difference of more than a year between the longest interval (Accra, Ghana — 37.5) and the shortest (Benin City, Nigeria — 24.7), no clear patterns emerge with respect to the birth interval and the geographic location of the country, the location of the facility within the country or the type of facility in which the delivery occurred.

**Figure 8. Mean Birth Interval, All Women With a Surviving Last Birth**

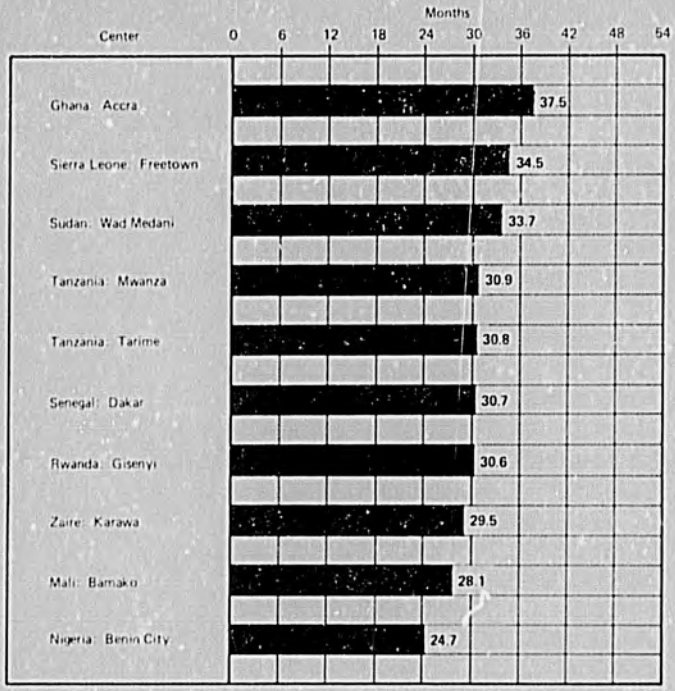



**Figure 9. Median Duration of Breast-feeding, All Women With a Surviving Last Birth**

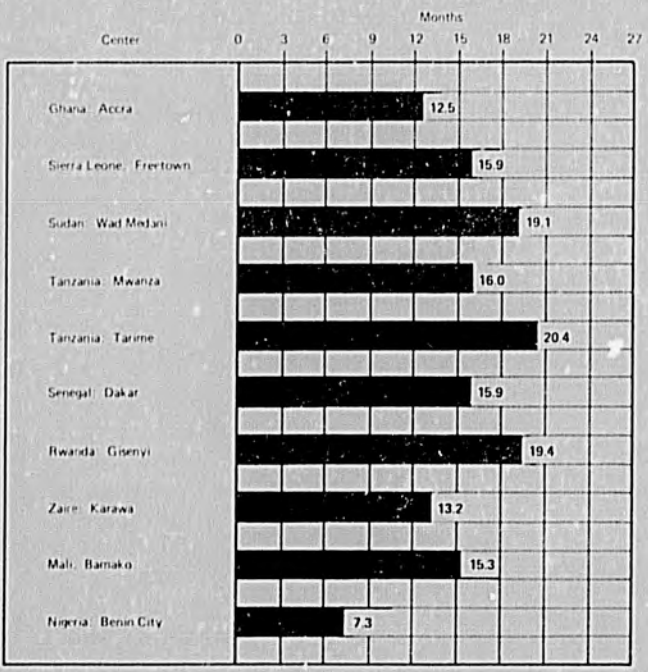
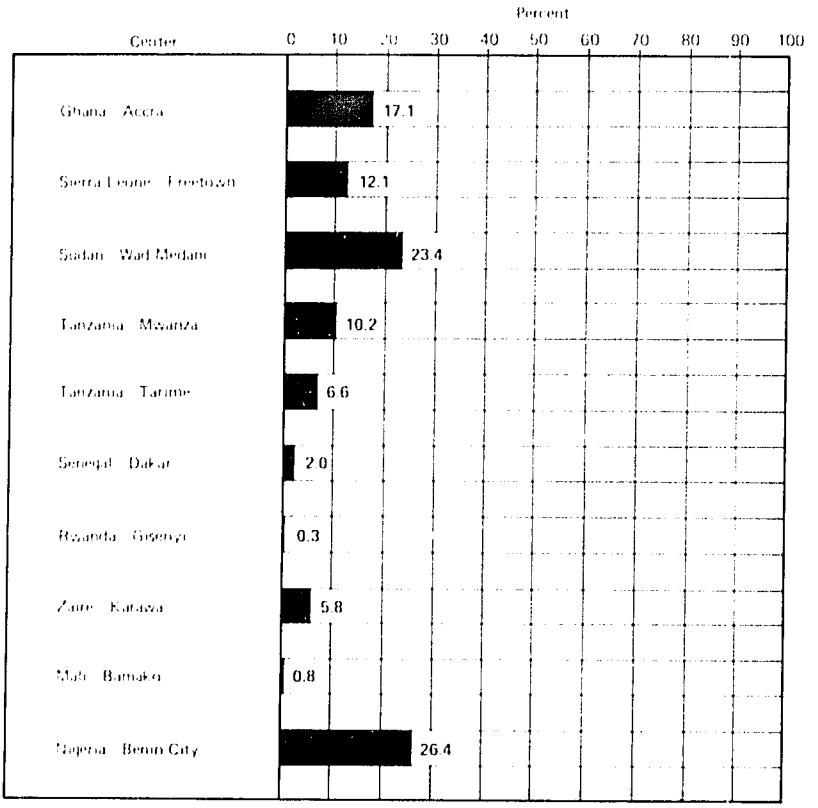


**Figure 10. Percent of Women Who Used Some Method of Contraception During the Last Birth Interval, All Women With a Surviving Last Birth**




2. *Breast-feeding*

Breast-feeding of the last surviving live birth was almost universal. Over 97% of all of the women in all of the centers reported that they breast-fed their last child. Figure 9 shows the median duration of breast-feeding by center, and again there emerges no clear geographic pattern. The longest duration of breast-feeding, 20.4 months, was reported in Tarime, Tanzania, and the shortest duration, 7.3 months, was reported in Benin City, Nigeria. No further information is available on feeding patterns or supplements; consequently, their effects cannot be determined.

3. *Contraceptive Use*

Figure 10 shows the percentage of women who used contraception in the interval between the penultimate and the current delivery. The data collected on contraceptive use have some important limitations. Women are asked only whether or not some method of contraception was used during the birth interval and, if so, what method was used. No further information is available about the length and regularity of use, the reasons for method discontinuation or the practice of more than one method of

contraception. Thus, it cannot be determined if the women became pregnant while using the method or stopped using the method in order to get pregnant.

While there is a wide range in the number of women who reported using contraception (from less than one percent in Bamako, Mali to 26% in Benin City, Nigeria), contraceptive use in general was relatively low. Again, the geographic location of the country, the location of the facility within the country and the type of facility in which the delivery occurred show no clear pattern of association with contraceptive use. Some of the differences in the levels of contraceptive use do seem to be related to lingering colonial influences on legislation regarding family planning and on the organization of health care delivery systems in general. All centers in former French and Belgian colonies report lower percentages of contraceptive use than any centers in former British colonies.

4. *Birth Intervals: Accra, Ghana and Dakar, Senegal*

In order to analyze further the relationships between breast-feeding, contraception and birth interval, the following discussion focuses on women in two centers, one located in Accra, Ghana and the other in Dakar, Senegal. Although the women delivering at each of these centers may not be representative of all women delivering in these areas, they are interesting in that they show important contrasts in breast-feeding and contraceptive use. Generally, women in Dakar reported long durations of breast-feeding and low contraceptive use, whereas women in Accra reported shorter durations of breast-feeding and higher contraceptive use.

Figure 11 shows the relationship between the length of the birth interval and both contraceptive use and the duration of breast-feeding. Controlling for the duration of breast-feeding, contraceptors had longer birth intervals than non-contraceptors. Differences were most pronounced among women who breast-fed for short periods.

Among those women in Accra who breast-fed for less than 12 months, the last birth interval was 10.7 months longer for contraceptors than for non-contraceptors. The comparable difference for women in Dakar was 14.9 months.

Controlling for contraception, the mean birth interval for contraceptors shows little variation with the duration of breast-feeding. In contrast, the mean birth interval for non-contraceptors generally increases with the duration of breast-feeding. For example, in Ghana, the mean birth interval for non-contraceptors increased from 35.5 months among women who breast-fed for less than 12 months to 41.2 months among women who breast-fed for 18 months or more. In Senegal this effect was even more pronounced.

We conclude that both contraceptive use and prolonged breast-feeding can lengthen the birth interval. If contraception is not practiced, breast-feeding plays an important role in lengthening the interval; otherwise its effects are minimal. It is not clear why, after controlling for the effects of both contraceptive use and breast-feeding, birth intervals should be so much longer for women in Accra than for women in Dakar. Among non-contraceptors who breast-fed less than 12 months, women in Dakar had birth intervals about a year shorter than women in Accra. Perhaps differences in the duration of postpartum abstinence could account for these results.

**Figure 11. Mean Birth Interval (months) by Duration of Breast-feeding and Contraceptive Use, All Women With a Surviving Last Birth**

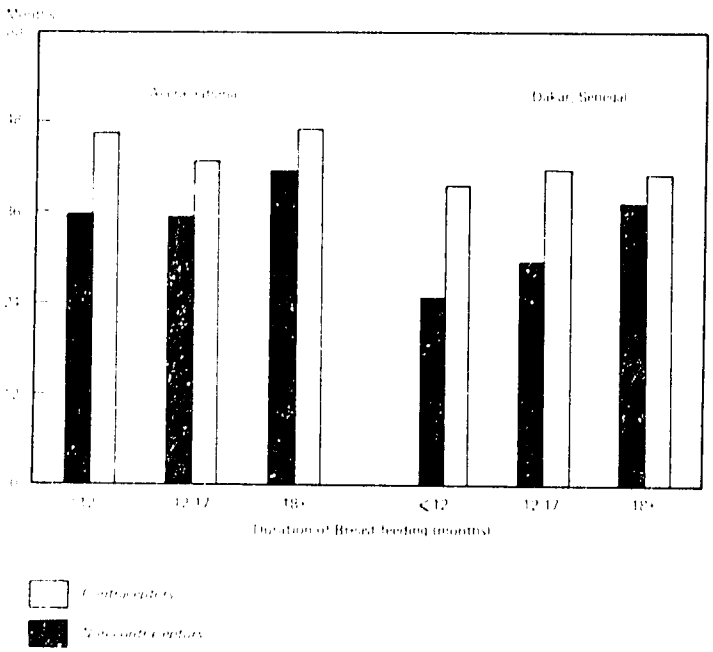
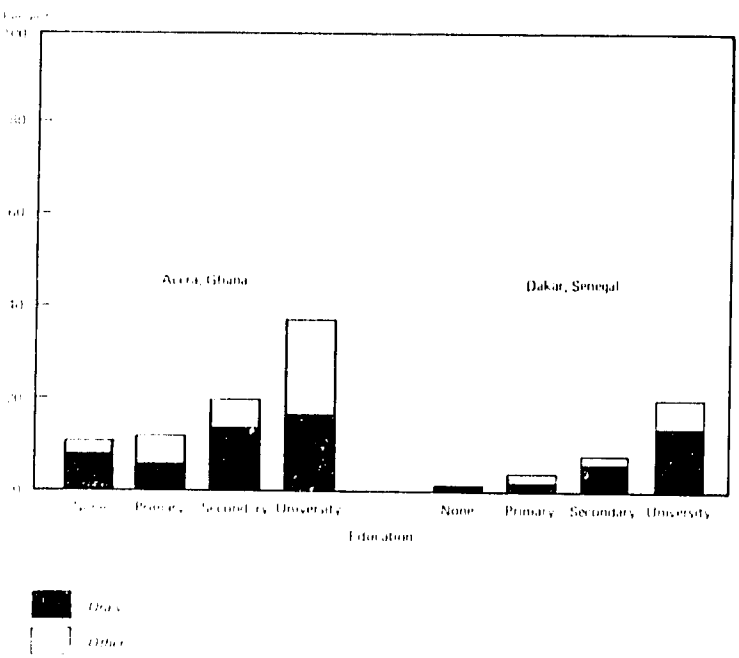


**Figure 12. Contraceptive Use Prior to Current Delivery by Education, All Women With a Surviving Last Birth**



It is often argued that modernization affects contraceptive use and the initiation and continuation of breast-feeding and thus has implications for child spacing practices (Caldwell, 1981). In order to gain insight into the effects of modernization on pregnancy intervals, we have examined the effects of education (the best indicator of socioeconomic status on the Maternity Record) on contraceptive use, duration of breast-feeding and child spacing.

The percentage of women who reported that they contracepted in the last birth interval was strongly associated with education (Figure 12). Among women in Accra, only 10.1% who had no education contracepted in the last birth interval as compared with 14.5% with some primary school, 19.7% for those with a secondary education and 36.6% for those with a university education.

Education was also strongly associated with the duration of breast-feeding (Figure 13): as the level of education increased, the duration of breast-feeding decreased. At every level of education, however, women in Senegal reported that they breast-fed longer than did women in Ghana. Among women with no formal education, only 27.5% in Ghana and 15.1% in Senegal breast-fed their last surviving infant for less than 12 months. Among women with 13 or more years of education, 82.7% of the Ghanaian women and 49.0% of the Senegalese women breast-fed their last surviving child for less than 12 months.

**Figure 13. Duration of Breast-feeding by Education, All Women With a Surviving Last Birth**

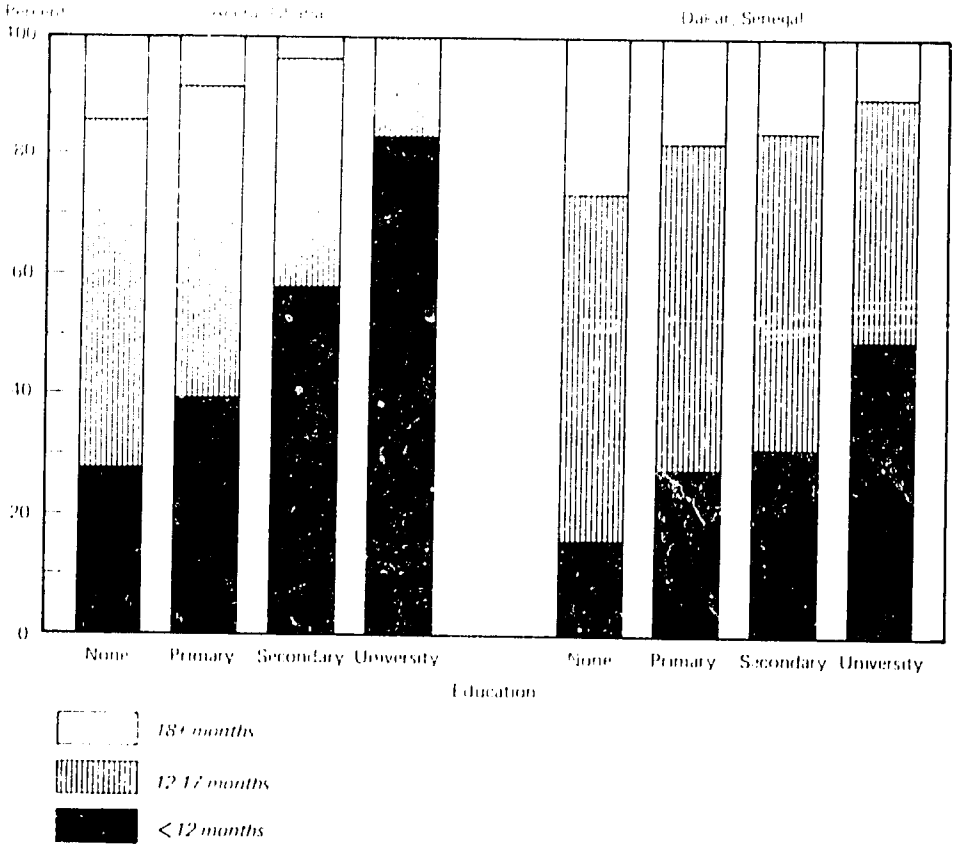
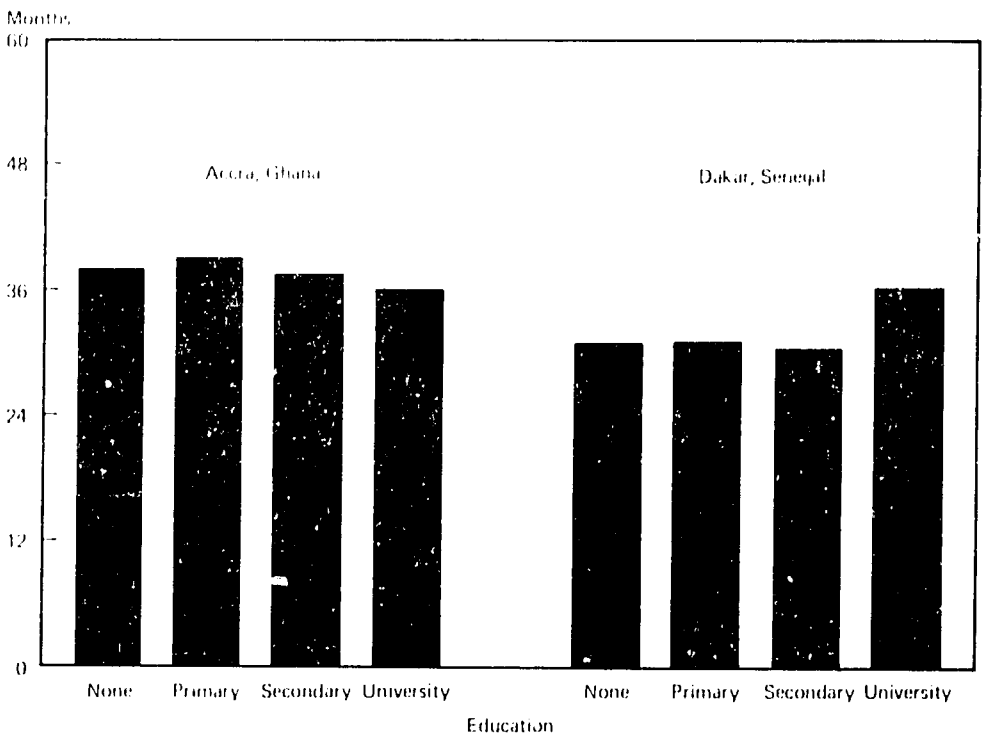


Figure 14 shows the mean birth interval for women in the four education groups for both centers. In Ghana, there was no consistent relationship between education and the length of the birth interval. In Senegal, women with a university education had longer birth intervals than women with less education, but education showed no apparent relationship to birth intervals for women with less than a university education. In general, then, the positive effect of education on contraceptive use appears to counterbalance the negative effect of education on breast-feeding in maintaining very similar birth intervals across educational groups. The only exception is, of course, in Senegal, where the very small number of university-educated women had much longer birth intervals than did women with less education.

As educational levels continue to increase throughout Africa, it is likely that the duration of breast-feeding will decline as more and more women adopt the breast-feeding practices of today's better educated women. Consequently, over the next several years, unless efforts are made to make family planning more widely available as a substitute for breast-feeding, birth intervals may decline.

**Figure 14. Mean Birth Interval (months) by Education, All Women With a Surviving Last Birth**



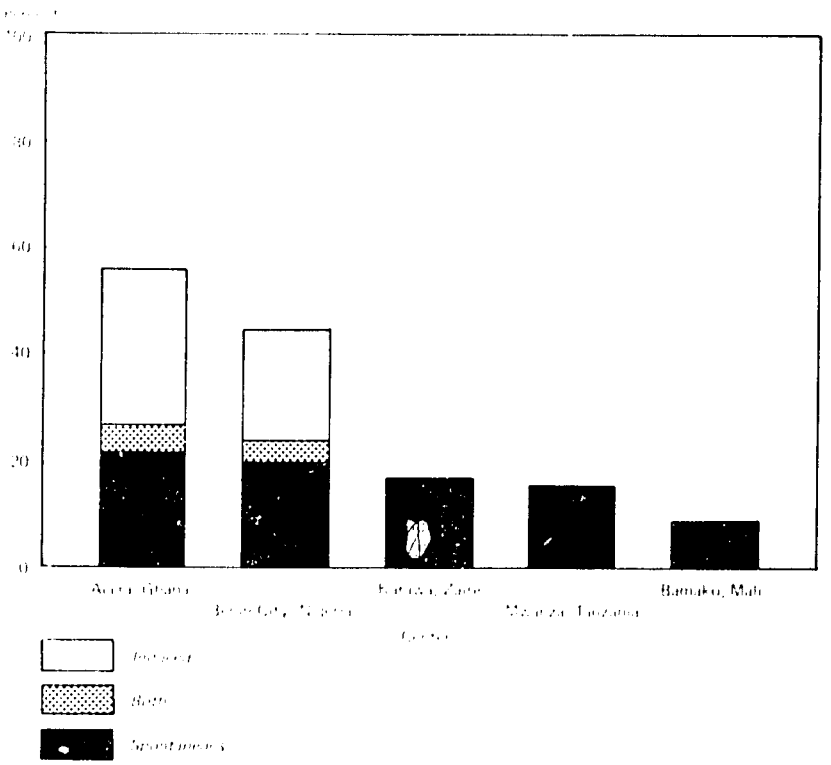
## C. Pregnancy Wastage

1. *Abortion Experience*

Figure 15 shows the percentage of women with either a spontaneous or an induced abortion experience among all previously pregnant women in five centers.[10] There appears to be wide variation in the percentages of women who reported either a spontaneous or an induced abortion. The percentage of women who reported that they had had only spontaneous abortions ranges from 9.0% in Mali to 21.4% in Ghana. It is likely that differences in recording practices account for some of the variation in the reported levels of spontaneous abortions, with underreporting in Mali.

Less than 1% of the women in 3 centers (Mali, Zaire, and Mwanza, Tanzania) reported having had an induced abortion as compared with over 20% for the other two centers (Ghana and Nigeria). How much of this difference is real and how much may be attributed to the reluctance of women in the former three centers to report an induced abortion is undetermined (Traore, 1981). It is known from other countries that induced abortions are usually underreported, even in those countries where the operation is legal (IPPF, 1967).

**Figure 15. Percent of Women With Previous Abortion Experience, All Ever-Pregnant Women**



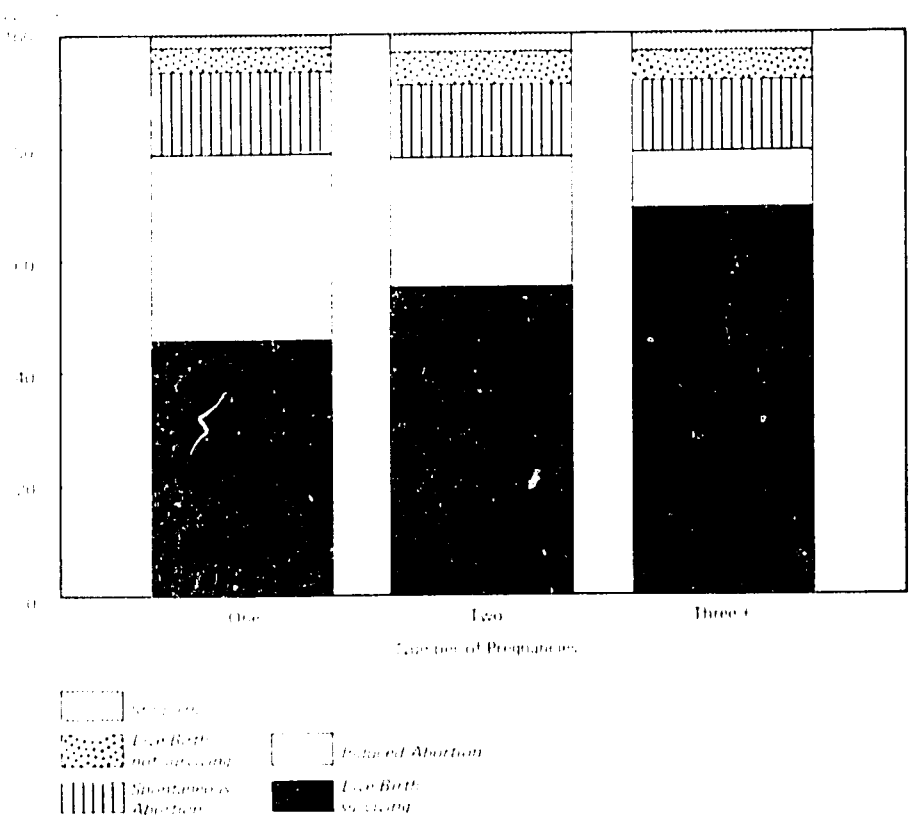

[10]Data used in this monograph were collected on two versions of the Maternity Record (see Appendices I and II). Consequently information regarding abortion experience is not available for women at all centers.

2. *Abortion Experience in Accra, Ghana*

In order to determine the factors that affect the likelihood of a woman reporting an abortion, especially an induced abortion, we focused on the group of Ghanaian women. This center was chosen because it had the highest percentage of women reporting abortion experience.

Figure 16 shows the outcome of the last pregnancy by the number of previous pregnancies for women with one, two, and three or more pregnancies. The outcome of the last pregnancy is categorized as follows: live birth—surviving, live birth—not surviving, stillbirth, induced abortion, spontaneous abortion. For each gravidity level, the percentage of women whose last pregnancy resulted in a spontaneous abortion, a stillbirth, or a live birth that did not survive remained almost constant. As gravidity increased, however, the percentage of women whose last pregnancy resulted in a surviving live birth also increased, while the percentage of women whose last pregnancy resulted in an induced abortion decreased. Fully one third of women with only one previous pregnancy reported that their pregnancy ended in an induced abortion as compared with fewer than a quarter of women with two previous pregnancies and only ten percent of women with three or more. These results imply that abortion may more often be used to delay the first birth rather than to space later births or to limit family size.

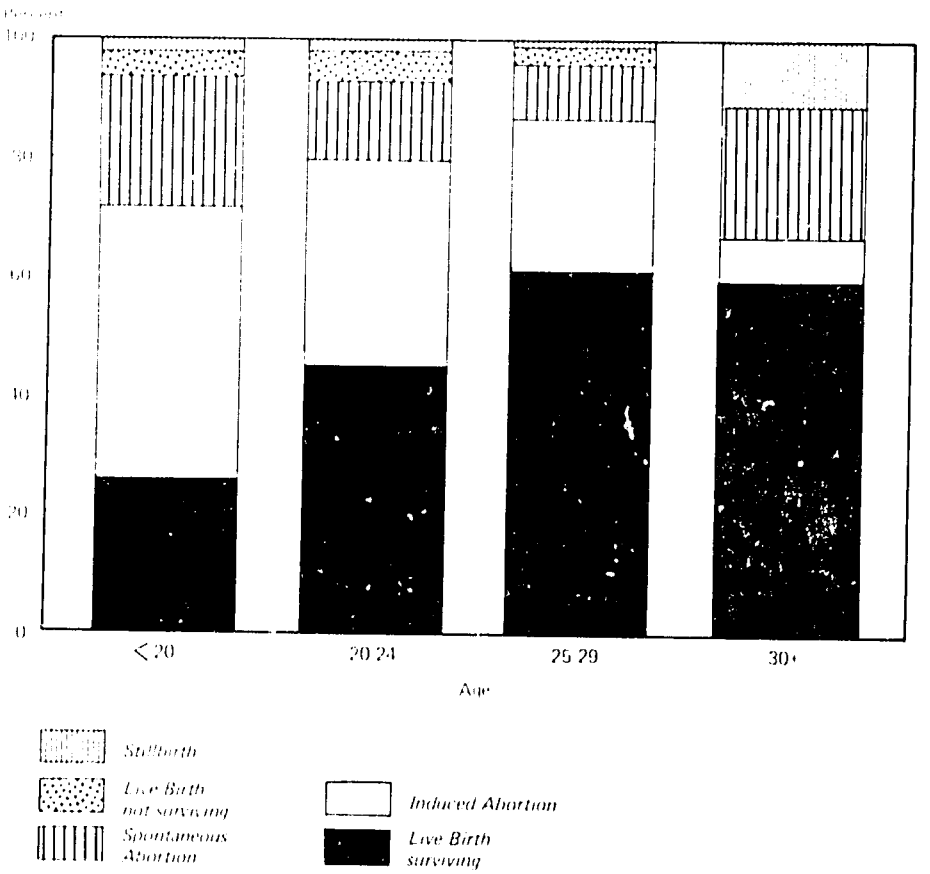
**Figure 16. Outcome of Last Pregnancy by Number of Previous Pregnancies**



In order to determine which women are most likely to have an abortion, we examined first pregnancy outcome by age and education. Figure 17 shows the outcome of that pregnancy by age. Women over 30 years of age[11] were markedly different from the younger women. A substantially higher proportion of their pregnancies ended in spontaneous abortions and stillbirths and a lower proportion resulted in induced abortions than for their younger counterparts.

For women under 30 years of age, the proportion of women with stillbirths and non-surviving live births was small and relatively constant. The percentage of women whose last pregnancy resulted in an induced abortion or spontaneous abortion decreased sharply with age, whereas the percentage with a surviving child increased. Among young (20 years and under) women, the proportion whose first pregnancy ended in an abortion was about two thirds and the proportion reporting an induced abortion was 45.6%. Even among older women (25-29), induced abortion experience was common, with over 25% reporting that their first pregnancy ended in an abortion.

**Figure 17. Outcome of Last Pregnancy by Age, Women With One Previous Pregnancy, Accra, Ghana**

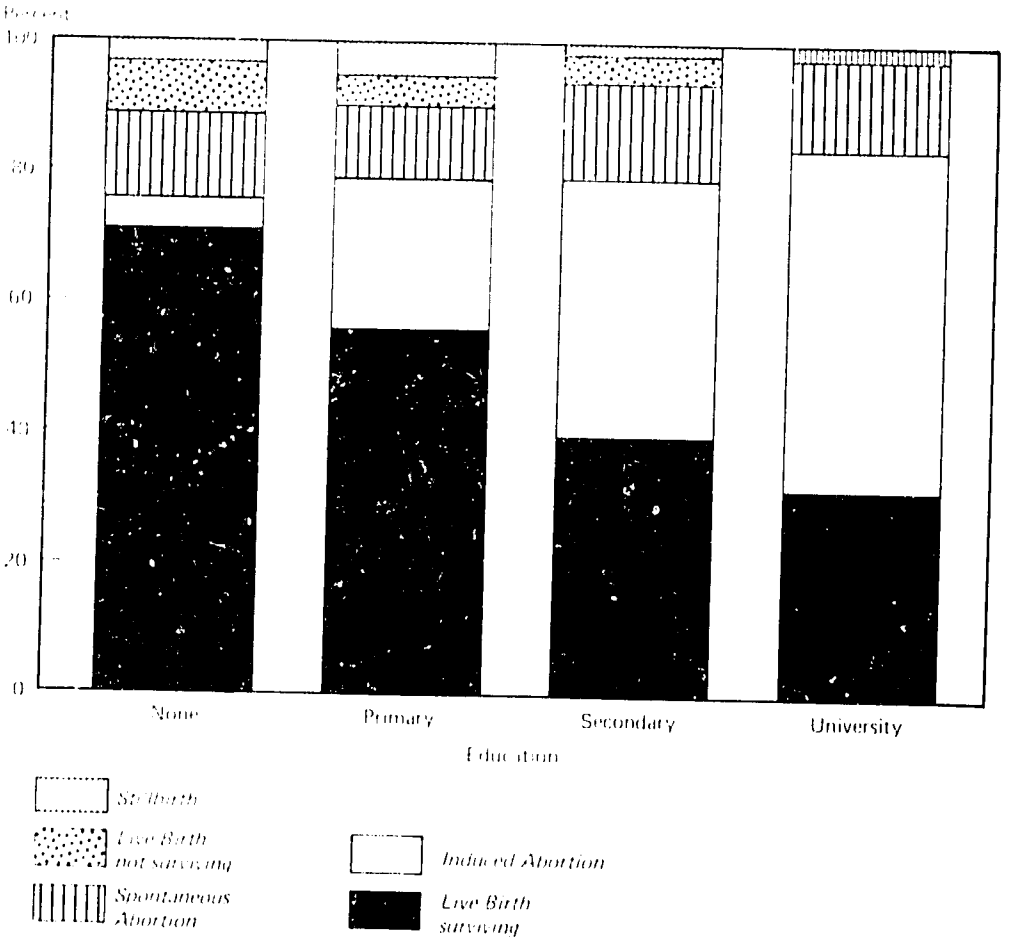



[11]The 27 women in this group are atypical in view of their age-parity status.

Figure 18 shows the variation in pregnancy outcomes associated with education. The proportion of women whose first pregnancy was reported to have ended in an induced abortion was under 5% for women with no education and over 50% for women with a university education. These results indicate that women most likely to seek abortion are young school girls for whom contraceptives may not be easily accessible and who want to delay family building in order to continue their education.

In Ghana, a high proportion (34.4%) of young women with one previous pregnancy reported that that pregnancy ended in an abortion. Of these women, only 10% reported that they went on to contracept after the abortion. The need to improve access to family planning, particularly among adolescents, is clear. As family planning programs are designed to meet the needs of the young, the incidence of induced abortion should decline.

**Figure 18. Outcome of Last Pregnancy by Education, Women With One Previous Pregnancy, Accra, Ghana**



## D. Contraceptive Plans and Postpartum Sterilization

1. *Contraceptive Plans*

The purpose of this section is to describe the contraceptive intentions of women following delivery, with special emphasis on postpartum sterilization.

Table 17 shows, by method, the planned contraception of women in ten centers in nine African countries.

The percentage of women who planned to use contraception ranged from a high of 63.5% in Wad Medani, Sudan to a low of 16.0% in Gisenyi, Rwanda. In general, oral contraceptives were by far the most prevalent method of planned contraception, accounting for at least 25% in every center. Only in two centers, Zaire and Rwanda, was another method (IUD) more prevalent, and in both of these centers oral contraception was the second most prevalent choice. The percentage of women planning female sterilization (FS) ranged from about 1% in Rwanda to almost 25% in Tarime, Tanzania and is perhaps higher in some places than might have been predicted. Planned use of barrier methods and/or traditional methods (rhythm or withdrawal) was generally low.

**Table 17. Percentage of Women Who Planned to Contracept and Method Planned**

| Center | % Who Planned to Contracept | % of Contraceptors Who Planned to Use Each Method | | | |
|---|---|---|---|---|---|
| | | Orals | IUD | FS | Other |
| Sudan: Wad Medani | 63.5 | 87.1 | 5.1 | 7.8 | 0.0 |
| Zaire: Karawa | 63.2 | 29.9 | 52.0 | 17.3 | 0.8 |
| Nigeria: Benin City | 44.7 | 65.1 | 22.6 | 8.9 | 3.1 |
| Tanzania: Tarime | 40.4 | 59.7 | 14.1 | 23.3 | 3.0 |
| Sierra Leone: Freetown | 34.8 | 51.2 | 24.2 | 13.5 | 11.0 |
| Mali: Bamako | 32.0 | 62.5 | 26.6 | 2.8 | 8.1 |
| Senegal: Dakar | 24.7 | 38.4 | 36.5 | 12.8 | 12.3 |
| Ghana: Accra | 20.3 | 60.6 | 13.3 | 15.3 | 11.3 |
| Tanzania: Mwanza | 16.3 | 77.4 | 5.8 | 13.6 | 3.2 |
| Rwanda: Gisenyi | 16.0 | 40.7 | 56.7 | 1.5 | 1.1 |

In every center, women who did not want any more children were significantly more likely to report that they planned to use contraception than were women who wanted more children (Table 18). The percentage planning to contracept, even among women who wanted more children, was much higher than the percentage who contracepted before the pregnancy. In some centers, however, a high proportion of women who wanted no more children had still not reached the stage of planning to adopt a modern method of contraception. In only two centers did more than 50% of the women who wanted more children report that they planned to contracept in order to space their next pregnancy. In Rwanda, only 8% of the women who reported that they wanted more children said that they planned to contracept.

Therefore, there is a need to encourage contraceptive use among women not planning to contracept but who want to delay the next birth and to provide all women who want to contracept with an appropriate method. Not all women who said that they planned to contracept will actually do so. Unless

contraceptive use is increased, some women who do not want more children will have additional births, and women who want more children will have pregnancies more closely spaced than is desirable.

2. *Postpartum Sterilization*

Information is available on tubal ligations and hysterectomies performed before discharge; thus, it is possible to determine what percentage of women who wanted no additional children planned a postpartum sterilization and of these, what percentage were actually sterilized prior to discharge (Figure 19).

While the percentage of women who planned sterilization may vary with reporting practices (some women may only say they plan to have a tubal ligation if they see some way of accomplishing this goal, whereas others may report that they plan to be sterilized even if this desire is still vague and not well-thought-out), the data are still useful in gaining information about the demand for sterilization. Only in Zaire, where unusual circumstances[12] make it advisable to sterilize a high proportion of women for medical reasons, was the proportion of women who planned to be sterilized over 50%. In Rwanda and Mali it was well under 10%, but since there are no doctors in these hospitals, women may report negatively, because they see no opportunity to be sterilized.

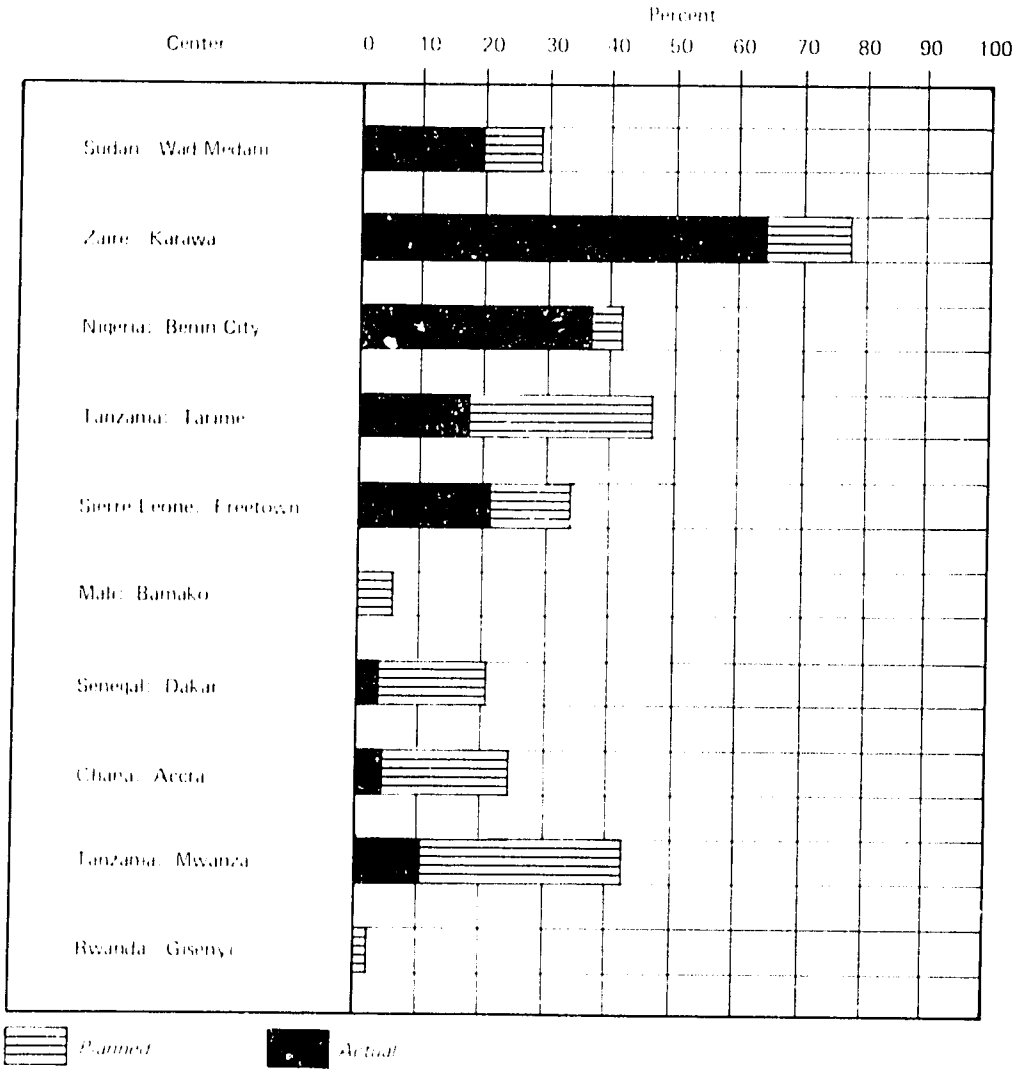
One important finding is that the number of women who were actually sterilized was much lower than the number who reported that they desired the operation. This probably indicates a lack of services and, in some cases, a bias against sterilization among hospital personnel.

**Table 18. Percent of Women Who Contracepted Before the Current Pregnancy and Percent Who Planned to Contracept After the Current Delivery, by Desire for Additional Children**

| Center | Desired Additional Children | | Did Not Desire Additional Children | |
|---|---|---|---|---|
| | Contracepted Before Current Pregnancy | Planned to Contracept After Current Delivery | Contracepted Before Current Delivery | Planned to Contracept After Current Delivery |
| Sudan: Wad Medani | 12.0 | 56.4 | 18.8 | 95.9 |
| Zaire: Karawa | 2.6 | 52.9 | 4.6 | 97.0 |
| Nigeria: Benin City | 30.9 | 39.8 | 25.5 | 93.0 |
| Tanzania: Tarime | 5.5 | 29.0 | 9.8 | 97.6 |
| Sierra Leone: Freetown | 8.4 | 27.9 | 23.7 | 81.0 |
| Mali: Bamako | 2.0 | 29.2 | 0.3 | 69.6 |
| Senegal: Dakar | 1.2 | 15.6 | 4.3 | 75.1 |
| Ghana: Accra | 11.4 | 14.7 | 24.1 | 64.9 |
| Tanzania: Mwanza | 7.1 | 12.9 | 18.4 | 79.4 |
| Rwanda: Gisenyi | 0.8 | 7.8 | 2.9 | 90.9 |

[12]Hypothyroidism. See Obstetric Practices section.

**Figure 19. Percent of Women Who Planned to Be Sterilized and Percent of Women Actually Sterilized Prior to Discharge from Hospital, All Women Who Desired No Additional Children**



# POLICY IMPLICATIONS

### A. Improving Maternity Care

The information available for most of sub-Saharan Africa indicates that the health status of the vast majority of its people is far from optimal. Poor health probably begins *in utero*, the result of pregnancies that are too early, too frequent, and too many in women who are undernourished and subjected to a variety of serious infections. While there is no single cure for the wide variety of problems that serve to keep health status low and impede development, improving the availability of family planning services as well as maternity care is one very important step in this direction. The data summarized in the preceding sections, although not necessarily representative of "sub-Saharan Africa," contain some clear messages for African health care providers and policy makers whose challenge is to allocate scarce resources so as to have the greatest possible impact on the health and well-being of African families. Some of the lessons to be learned here are summarized in the following paragraphs.

1. *Antenatal care makes a difference.* Measured in terms of survival of the mother and her infant, the more antenatal visits a woman makes, the better the outcome of her pregnancy. The data presented in this paper show that the advantage of antenatal care is a real one and not a function of characteristics, such as education, associated with women who seek antenatal care. Regular visits to an antenatal clinic provide an opportunity to diagnose problems that may result in difficulties for labor and delivery and thus permit early referral of women likely to experience complications. Given the short supply of physicians in most areas, the optimal use of their time is for them to manage only cases of high risk, leaving the majority of uncomplicated deliveries to be managed by non-physicians. Early recognition and referral of women at high risk can do much to lower mortality rates. Women at greatest risk of dying are those who arrive as emergency admissions. Often these women have been in labor for several hours -- or even days -- and have had no antenatal care.

In addition to early diagnosis of problems, antenatal visits also provide an opportunity to educate the expectant mother and reinforce beneficial practices such as breast-feeding and good nutrition. Discussions of family planning and postpartum contraception can also be initiated during the antenatal visits.

2. *Conservative use of surgical interventions is indicated where women are unlikely to return to the hospital for subsequent deliveries.* While these data indicate that many women with previous cesarean deliveries were able to deliver vaginally, it is known from experience elsewhere that these women are also at greater risk of uterine rupture.

It is common practice in parts of Africa to use symphysiotomy to manage cases of feto-pelvic disproportion and obstructed labor. The stated advantage of symphysiotomy is that it permanently enlarges the pelvis, allowing for vaginal delivery of subsequent pregnancy. However, little has been done to prove this assumption. Further study is needed to determine the relative risks and advantages of cesarean section vs. symphysiotomy, not only for the outcome of the current pregnancy, but also for long-term morbidity and for their effect on subsequent deliveries. For women at great distances from a hospital who have poor or no transportation available, and who do not have access to prenatal care permitting diagnosis of potential complications in subsequent pregnancies, the advantages of surgical delivery must be weighed carefully against the disadvantages.

For cases where surgical intervention is required, further research is needed to determine the safest and most appropriate management technique.

3. *Women who are older, of high parity, less well educated and who have had poor outcomes of previous pregnancies are more likely to die in childbirth.* For these women, the decision to use contraception, including sterilization, can be a life-or-death decision. For those women who have no surviving children from previous pregnancies and for whom the current pregnancy is very important, the advantages of early and regular antenatal care are emphasized. Women in these studies who died giving birth had often had no antenatal care and arrived at the hospital in too poor a condition to be saved.

4. *With physicians in short supply, non-physicians must be used to provide the majority of maternity care services and must be able to recognize women at high risk so as to make timely referrals of those cases needing the care of a physician.* The data presented in this report indicate that careful screening of women at high risk can be effective in conserving resources. A large proportion of women with previous cesarean deliveries can have safe vaginal deliveries attended by non-physicians if they have uncomplicated pregnancies and labors.

While vaginal deliveries by non-physicians are fairly common for breech presentations, the outcomes for breech babies delivered vaginally are poorer than for those delivered by cesarean section. Careful choices must be made regarding risks to the mother versus risks to the infant in determining appropriate obstetric management of breeches.

5. *Large families are important to African women, and until they have at least six to eight surviving children, they are not interested in terminating their fertility.* Even among educated women, the average number of children wanted, although lower than for uneducated women, is still high. Where child mortality is high, having many children ensures that at least some of them will survive to adulthood. Among women who had the same number of children antecedent to the last birth, those with a surviving last birth want fewer additional children than do women whose last child did not survive. Improving the chances of child survival, then, in addition to being an end in itself, it also an important step in reducing high rates of fertility. The reduction in mortality and consequent decrease in desire for additional children indicates an increasing unmet need for family planning services.

6. *Prolonged breast-feeding has an important impact on birth intervals, especially in areas where use of modern contraception is low.* It is important for health care providers and policy makers to reinforce the practice of breast-feeding, not only for its nutritional and immunogenic advantages for the newborn but also as a mechanism of pregnancy spacing for women who do not use a modern contraceptive method. In urban areas such as Accra, Ghana, where the mean duration of breast-feeding is shorter, substituting modern contraception may make up for the protective effects against pregnancy lost by breast-feeding for a shorter period. However, in some situations, women are abandoning traditional patterns of breast-feeding more rapidly than they are adopting modern methods of contraception.

7. *Induced abortion is being used by young women in many areas to delay the first birth rather than as a means to limit fertility or space pregnancies.* Abortion is illegal in all but one sub-Saharan African country, and most induced abortions are performed outside of the health care system. However,

women come to hospitals for treatment of complications of induced abortion, and such treatment consumes a large proportion of scarce health resources. Complications of illegal abortions may also increase the risk of subsequent infertility. Where policy makers and health care providers are concerned with reducing the incidence of induced abortion, strengthening of family planning services, particularly for young women, will enable them to postpone childbearing until they have completed schooling and are married and able to care for children.

8. *Although previous experience with contraception is low, many women desire to use contraception following the current delivery.* The importance of adequate spacing of births has long been recognized in many African cultures, and the traditions of prolonged breast-feeding and postpartum abstinence have served as the mechanisms to effect birth spacing of two to three years.

Modernization, however, results in the breakdown of these long-standing traditional practices. Postpartum abstinence becomes less acceptable when polygamy is no longer as widespread, and women who are in the labor force may not be able to breast-feed their infants as long as those who remain at home. Although few women were interested in permanently halting childbearing, the relatively high percentages of women in some centers who were interested in contraception indicates that they continue to understand the importance of child spacing. Improved availability of contraceptive services should markedly increase current low levels of contraceptive use.

### B. Future Directions

The basis for changing policies to improve reproductive health is information. In most countries of sub-Saharan Africa, policy makers are only beginning to be aware of the perils of rapid population growth and of the negative impact of high fertility on the health of African families.

To understand fully the negative consequences of high fertility, early childbearing, and pregnancies that are too closely spaced, and to begin to address the many problems that confront them, policy makers must have high quality, representative, timely information about those problems, the factors associated with them, and the availability and distribution of resources that can be summoned to address them. In most sub-Saharan countries, such information is unavailable, outdated, or in an unusable format. In many rural areas, either only rudimentary statistics on the operation of health and family planning programs are maintained or cumbersome registers kept. In hospitals with larger numbers of deliveries, these registers are quickly filled and disappear into a records storage room from which it is virtually impossible to retrieve them. When they do find their way to a statistical unit of the hospital or government office, tedious hand-tallying of limited information often results in reports that are, at best, two or three years late and of questionable accuracy.

The preceding sections have described and presented data from maternity care monitoring studies in ten sub-Saharan African countries. In some countries, these studies have produced the only data available on obstetric management and use of family planning. These initial studies have been mainly in response to requests from interested researchers. Such requests have come from individuals and institutions ranging from small rural maternities to major urban hospital/maternities. These studies are of value to the providers at

particular institutions, but the limited geographic coverage of data collection lowers their general usefulness, especially for drawing conclusions about maternity care in a country or region. However, they illustrate the importance of expanding data collection beyond isolated projects to cover a more representative sample of providers of pregnancy-related care. More representative data will give a clearer picture of maternity care and family planning services for women delivering babies in hospitals and maternity centers for a region or a country as a whole.

Well-selected samples that include various levels of care and that are representative of different regions and population groups in a country can provide a better basis for drawing conclusions as to the most important problems confronting those who care for pregnant women and their infants. A clear delineation of the problems can be the first step in suggesting solutions.

Representative data from a variety of centers throughout a region or country would also serve as a basis for measuring the impact of changes or improvements in the maternal care system. As women at risk of unwanted pregnancy gain access to more effective means of preventing pregnancy, the number of admissions for treatment of deliberate pregnancy interruptions should drop, thereby serving as an indicator of the success of the family planning service program.

Policy makers should be involved early in the planning process for large national sample studies. They should play a key role in determining the major questions to be addressed as well as in devising strategies for disseminating and using the information to be gathered by such a study. Early involvement and regular feedback during the course of such a project will help to assure that findings have the maximum policy impact.

Service providers also need information as well as training to enable them to get the greatest benefit from participating in a study. Careful training at the onset of data collection can improve the quality of the information gathered and can also generate interest among the service providers in the process of care giving. This interest will serve as a basis for understanding problems and improving services. Regular sharing of information gathered through such studies with the health care providers can further strengthen this process.

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# APPENDICES

INTERNATIONAL FERTILITY RESEARCH PROGRAM

# MATERNITY RECORD

**PATIENT IDENTIFICATION:** 1 Hospital or clinic no _____ 2 Admission date _____ (day month year)

3 Patient's name _____ (family first maiden) Husband's name _____

4 Address _____

## STUDY IDENTIFICATION

5 Center name _____ and number

6 Study number 9 0 3 (4-6)

7 Patient order number (7-11)

8 Delivery date _____ (day month year) (12-17)

9 Registration status 0) not booked 1) booked, patient's choice 2) referred by physician 3) referred by midwife 4) emergency 8) other _____ (18)

## PATIENT CHARACTERISTICS

10 Residence 1) urban 2) rural 3) urban slum 4) rural slum (19)

11 Patient's status 1) private 2) not private 8) other (20)

12 Patient's age *(completed years)* (21-22)

13 Patient's education *(school year completed)* 0) 0 1) 1-2 2) 3-4 3) 5-6 4) 7-8 5) 9-10 6) 11-12 7) 13-14 8) 15+ (23)

14 Marital status 1) never married 2) currently married 3) divorced 4) separated 5) widowed 6) consensual union 8) other (24)

15 Age at first marriage union *(completed years)* (25-26)

36 Anesthetic administered 0) none or psychoprophylaxis only 1) analgesic systemic or inhalation 2) local 3) paracervical pudendal 4) spinal epidural 5) general 6) 1 and 2 or 1 and 3 7) other combination 8) other _____ (52)

37 Episiotomy 0) none 1) midline 2) midline with extension 3) midline with hematoma 4) mediolateral 5) mediolateral with extension 6) mediolateral with hematoma 8) other (53)

38 Type of delivery 0) spontaneous 1) outlet forceps 2) vacuum extractor 3) mid- or high forceps 4) manual rotation 5) breech extraction 6) cesarean section 7) destructive procedure 8) other _____ (54)

39 Primary injury during labor and or delivery 0) none 1) vulva 2) vagina 3) perineum 4) cervix 5) uterus 6) rectum 7) bladder 8) other _____ (55)

40 Primary complication of labor and or delivery 0) none 1) prolonged obstructed labor 2) placenta previa 3) placenta abruptio 4) hypotonic uterine contractions 5) hypertonic uterine contractions 6) hemorrhage 7) retained products 8) other _____ (56)

41 Secondary complication of labor and or delivery 0) none 1) prolonged labor 2) cord prolapse 4) hypotonic uterine contractions 5) hypertonic uterine contractions 6) hemorrhage 7) retained products 8) other _____ (57)

**OBSTETRIC HISTORY (not including this pregnancy)**

16 Total live births [ ][ ] 27-28

17 Children now living
number of males [ ] 29
*(8 or more = 8)*
number of females [ ] 30

18 Duration of breast-feeding of last live birth *(in months)* 0) did not breast-feed 1) <3 2) <6 3) <9 4) <12 5) <15 6) <18 7) <21 8) ≥21 [ ] 31

19 Number of stillbirths *(8 or more = 8)* [ ] 32

20 Number of infant deaths *(less than 12 completed months, 8 or more = 8)* [ ] 33

21 Number of spontaneous abortions *(8 or more = 8)* [ ] 34

22 Number of induced abortions *(8 or more = 8)* [ ] 35

23 Outcome of last pregnancy 0) not previously pregnant 1) live birth, full term, still living 2) live birth, full term, deceased 3) live birth, premature, still living 4) live birth, premature, deceased 5) stillbirth 6) induced abortion 7) spontaneous abortion 8) other [ ] 36

24 Number of months since last pregnancy ended *(98 or more = 98)* [ ][ ] 37-38

25 Contraceptive method mainly used before conception 0) none 1) IUD 2) orals/injectables 3) female sterilization 4) male sterilization 5) condom 6) withdrawal/rhythm 7) foam/diaphragm/jelly 8) other _____ [ ] 39

**MEDICAL DATA**

26 Number of antenatal visits *(8 or more = 8)* [ ] 40

27 Primary antenatal condition *(see code list)* [ ][ ] 41-42

42 Duration of labor *(in completed hours)* 0) none 1) <2 2) 2-6 3) 7-12 4) 13-18 5) 19-24 6) 25-48 7) over 48 [ ] 58

43 Attendant at delivery 0) none 1) nurse 2) qualified midwife 3) student nurse-midwife 4) paramedic 5) medical student 6) general physician 7) OB-GYN physician 8) other _____ [ ] 59

44 Birth weight *(gm, 9988 or more = 9988)* [ ][ ][ ][ ] 60-62

45 Sex of infant(s) born at this delivery
number of males [ ] 63
*(write number of each)*
number of females [ ] 64

46 Apgar score 9) not done
at 1 minute [ ] 65
*(8 or more = 8)*
at 5 minutes [ ] 66

**For items 47-48, use the following codes:** 0) normal or stillbirth with no apparent pathology 1) fetal distress during labor 2) minor malformation 3) major malformation 4) respiratory distress syndrome 5) isoimmunization 6) neonatal sepsis 7) trauma 8) other *(for codes 2, 3, 7 and 8, specify)*

47 Primary fetal neonatal condition, specify _____ [ ] 67

48 Secondary fetal/neonatal condition, specify _____ [ ] 68

49 Death of fetus/newborn 0) none 1) antepartum, one 2) antepartum, two or more 3) intrapartum, one 4) intrapartum two or more 5) postpartum, one 6) postpartum, two or more 7) combination 8) other _____ [ ] 69

50 Primary puerperal condition 0) normal 1) fever requiring treatment 2) bleeding requiring treatment 3) urinary tract infection 4) mastitis 5) phlebitis 6) dehiscence 7) death *(complete Death Report)* 8) other _____ [ ] 70

28 Hospitalization required during this pregnancy 0) no 1) yes for condition indicated in Item 27 2) yes for condition other than the one indicated in Item 27 specify condition _____ [ ] 43

29 Tobacco smoking during pregnancy 0) none **During part of pregnancy** *(cigarettes day)* 1) 1-10 2) 11-20 3) 21 or more **Throughout pregnancy** *(cigarettes day)* 4) 1-10 5) 11-20 6) 21 or more 8) cigars, pipes, etc [ ] 44

30 Number of previous cesarean sections [ ] 45

31 Estimated duration of pregnancy *(menstrual age in completed weeks)* [ ][ ] 46-47

32 Hemoglobin at admission for delivery (to nearest gm) 1) 5 gm 2) 6 gm 3) 7 gm 4) 8 gm 5) 9 gm 6) 10 gm 7) 11 gm 8) 12 gm 9) not done [ ] 48

33 Rupture of membranes **Spontaneous**: 1) < 24 hrs before delivery 2) > 24 hrs before delivery **Artificial**: 3) < 24 hours before delivery 4) > 24 hrs before delivery 5) during cesarean section [ ] 49

34 Type of labor 0) no labor 1) spontaneous 2) spontaneous, augmented with artificial rupture of membranes (ARM) 3) spontaneous, augmented with drugs 4) spontaneous, augmented with ARM and drugs 5) induced, with ARM 6) induced, with drugs 7) induced, with ARM and drugs 8) other _____ [ ] 50

**For multiple births, code information for the most difficult delivery in Items 35, 38, 44, 46, 47 and 48 and complete a separate Multiple Birth Record for each infant.**

35 Type of presentation during labor 0) vertex, occiput anterior 1) vertex, occiput transverse or posterior 2) frank breech 3) footling breech 4) complete breech 5) brow face 6) transverse lie 7) compound 8) other _____ [ ] 51

51 Maternal blood transfusion during hospitalization 0) none 1) yes before delivery 2) yes during delivery 3) yes after delivery 4) 1 and 2 5) 1 and 3 6) 2 and 3 7) 1, 2 and 3 [ ] 71

52 Number of nights hospitalized this admission before delivery *(8 or more = 8)* [ ] 72

**SPECIAL STUDIES**

53 _____ [ ] 73

54 _____ [ ] 74

55 _____ [ ] 75

**Complete these items at time of discharge:**

56 Number of nights hospitalized this admission after delivery *(8 or more = 8)* [ ] 76

57 Female sterilization 0) none 1) before this delivery 2) at cesarean section 3) immediately after delivery 4) same day 5) 1-2 days later 6) 3-4 days later 7) 5-9 days later 8) 10 or more days later [ ] 77

58 Number of additional children wanted *(8 or more = 8)* [ ] 78

59 Contraceptive method planned or provided 0) none 1) IUD 2) orals, injectables 3) female sterilization 4) male sterilization 5) condom 6) withdrawal/rhythm 7) foam, diaphragm, jelly 8) other _____ [ ] 79

[1] 80

Recorder's name _____

*PLEASE AIRMAIL TO: International Fertility Research Program, Research Triangle Park, North Carolina 27709 USA*

MAT 001 12-78

INTERNATIONAL FERTILITY RESEARCH PROGRAM

# MATERNITY RECORD SUMMARY

*Please circle appropriate choices and fill in boxes and blanks.*

**PATIENT IDENTIFICATION:** 1. Hospital or clinic no. _____ 2 Admission date _____ (day month year)

3. Patient's name _____ Husband's name _____

4. Address _____

**STUDY IDENTIFICATION**

5. Center name _____ and number: [ ][ ][ ] 1-3

6. Study number: [9][1][0] 4-6

7. Patient order number: [ ][ ][ ][ ][ ] 7-11

8. Delivery date: [ ][ ] [ ][ ] [ ][ ] 12-17 (day month year)

9. Patient's age: *(completed years)* [ ][ ] 21-22

10. Patient's education: *(school year completed)* 0) 0 1) 1-2 2) 3-4 3) 5-6 4) 7-8 5) 9-10 6) 11-12 7) 13-14 8) 15+ [ ] 23

11. Age at first marriage/union: *(completed years)* [ ][ ] 25-26

**OBSTETRIC HISTORY (not including this pregnancy)**

12. Total live births: [ ][ ] 27-28

13. Children now living: number of males *(8 or more = 8)* [ ] 29; number of females [ ] 30

14. Duration of breast-feeding of last live birth: 0) did not breast-feed 1) <3 months 2) <6 3) <9 4) <12 5) <15 6) <18 7) <21 8) ≥21 months [ ] 31

15. Number of stillbirths: *(8 or more = 8)* [ ] 32

24. Type of delivery: 0) spontaneous 1) outlet forceps 2) vacuum extractor 3) mid- or high forceps 4) manual rotation 5) breech extraction 6) cesarean section 7) destructive procedure 8) other _____ [ ] 54

25. Primary complication of labor and or delivery: 0) none 1) prolonged obstructed labor 2) placenta previa 3) placenta abruptio 4) hypotonic uterine contractions 5) hypertonic uterine contractions 6) hemorrhage 7) retained products 8) other _____ [ ] 56

26. Attendant at delivery: 0) none 1) nurse 2) qualified midwife 3) student nurse midwife 4) paramedic 5) medical student 6) general physician 7) OB/GYN physician 8) other _____ [ ] 59

27. Birth weight in grams [ ][ ][ ][ ] 60-62

28. Sex of infant(s) born at this delivery: number of males *(write number of each)* [ ] 63; number of females [ ] 64

29. Apgar score 9) not done: at 1 minute *(8 or more = 8)* [ ] 65; at 5 minutes [ ] 66

30. Primary fetal/neonatal condition: 0) normal, or stillbirth with no apparent pathology 1) fetal distress during labor 2) minor malformation 3) major malformation

16. Outcome of last pregnancy: 0) not previously pregnant 1) live birth, full term, still living 2) live birth, full term, deceased 3) live birth, premature, still living 4) live birth, premature, deceased 5) stillbirth 6) induced abortion 7) spontaneous abortion 8) other _____ [ ] 36

17. Number of months since last pregnancy ended *(98 or more = 98)* [ ][ ] 37-38

18. Contraceptive method mainly used before conception: 0) none 1) IUD 2) orals/injectables 3) female sterilization 4) male sterilization 5) condom 6) withdrawal/rhythm 7) foam/diaphragm/jelly 8) other _____ [ ] 39

**MEDICAL DATA**

19. Primary antenatal condition: 00) none 02) placenta previa 06) antepartum hemorrhage 10) preeclamptic toxemia 11) eclampsia 14) urinary tract infection 29) anemia 35) incompetent cervix 79) diabetes 98) other _____ [ ][ ] 41-42

20. Number of previous cesarean sections [ ] 45

21. Estimated duration of pregnancy: *(menstrual age in completed weeks)* [ ][ ] 46-47

22. Type of labor: 0) no labor 1) spontaneous 2) spontaneous, augmented with artificial rupture of membranes (ARM) 3) spontaneous, augmented with drugs 4) spontaneous, augmented with ARM and drugs 5) induced, with ARM 6) induced, with drugs 7) induced, with ARM and drugs 8) other _____ [ ] 50

**In case of multiple birth, record the most difficult delivery in Items 23, 24, 27, 29 and 30, and complete a Multiple Birth Record for each child.**

23. Type of presentation during labor: 0) vertex, occiput anterior 1) vertex, occiput transverse or posterior 2) breech, frank 3) breech, footling 4) complete breech 5) brow/face 6) transverse lie 7) compound 8) other _____ [ ] 51

4) respiratory distress syndrome 5) isoimmunization 6) neonatal sepsis 7) trauma 8) other *For codes 2), 3), 7), 8), specify* _____ [ ] 67

31. Death of fetus newborn: 0) none 1) antepartum, one 2) antepartum, two or more 3) intrapartum, one 4) intrapartum, two or more 5) postpartum, one 6) postpartum, two or more 7) combination 8) other _____ [ ] 69

32. Primary puerperal condition: 0) normal 1) fever requiring treatment 2) bleeding requiring treatment 3) urinary tract infection 4) mastitis 5) phlebitis 6) dehiscence 7) death *(complete Death Report)* 8) other _____ [ ] 70

**SPECIAL STUDIES**

33 _____ [ ] 73

34 _____ [ ] 74

35 _____ [ ] 75

*COMPLETE THESE ITEMS AT TIME OF DISCHARGE*

36. Female sterilization: 0) none 1) before this delivery 2) at cesarean section 3) immediately after delivery 4) same day 5) 1-2 days later 6) 3-4 days later 7) 5-9 days later 8) 10 or more days later [ ] 77

37. Number of additional children wanted: *(8 or more = 8)* [ ] 78

38. Contraceptive method planned or provided: 0) none 1) IUD 2) orals/injectables 3) female sterilization 4) male sterilization 5) condom 6) withdrawal/rhythm 7) foam/diaphragm/jelly 8) other _____ [ ] 79

Recorder's name _____ [1] 80

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