MotherCare™ *Matters*

Five Years of Learning and Action

1993-1998

A Compendium of Quarterly Newsletters and Literature Reviews on Maternal and Neonatal Health and Nutrition

Special Thanks and Acknowledgments

There are so many people I am grateful to for having made this newsletter possible. I am sure I will miss some unwittingly. Let me begin however, by saying thank you to Mary Ann Anderson of USAID, who not only nurtured the idea of a newsletter with us in 1990, but gave it the name, *MotherCare Matters*. The format of the newsletter is patterned after *Technical Updates*, PRITECH's newsletter, with comments by Rob Northrop of MSH. *Technical Updates* supplied me with much needed information and a glimpse into the current thinking from a global perspective while doing fieldwork in Bangladesh. I wanted to do the same in safe motherhood.

The guidance of Mary Ellen Stanton of USAID has been pivotal toward our progress in learning, with her continual stimulating, supportive, and strategic advice for our work during MotherCare's second phase, 1993-1998. MotherCare staff have shouldered much of the burden (and joys!) of developing *MotherCare Matters*. They have contributed extensively in writing abstracts and commentaries and at some points, guiding the entire process of putting together a complete issue. Staff also have formally edited text and always ensured the production and distribution of the final issues. Over the years, many non-staff individuals have also contributed by writing specific articles for MotherCare or by commenting on ones that had been selected. To each, I am especially grateful for helping us fill in some of the gaps in our knowledge and dispelling the myths that abound in these fields. In every issue of *MotherCare Matters*, such persons and staff are named with our gratitude.

Steve Jacobs of Jacobs Design, who designs and produces the final issue of *MotherCare Matters*, has been ever prompt, flexible, and gracious in responding to our last-minute changes, as well as enhancing our work so nicely through his creativity. To him, we are most grateful for making our efforts readable!

Finally, to our donor, institutional base, and close colleagues, we also add our thanks for continued support. MotherCare is funded by the Office of Health and Nutrition, U.S. Agency for International Development (Contract No. HRN-C-00-93-00038-00) and implemented by John Snow, Inc., and its subcontractors, the American College of Nurse-Midwives, Family Health International, Program for Appropriate Technology in Health and the London School of Hygiene and Tropical Medicine.

Marge Koblinsky
Director, MotherCare

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MOTHERCARE MATTERS

Introduction

We began the literature review process that became *MotherCare Matters* out of a concern that we, MotherCare, be able to program well for safe motherhood by building on lessons learned. What we found was that the literature on maternal and newborn health and nutrition was voluminous and confusing. As we delved into the literature more critically, we discovered few articles that went beyond the descriptive, and fewer still were designed to answer questions. It became obvious that community studies relied on reports made by women, yet the validity of such self-reports had not been verified and terms rarely defined. Clinical studies relied on records or observations of a self-selected population, where little was known about the skills and training of the recorder or even the definitions by which s/he worked. The study populations were typically small and non-representative. Trying to make sense of the literature meant reading a lot to find the few with reliable data.

Over the years we have looked at a variety of topics within the fields of maternal and newborn health and nutrition. In most issues of *MotherCare Matters,* we chose a specific focus and abstracted up to four articles we thought were pivotal to the current thinking in the focal area. The articles abstracted were selected because we felt they had the most to say or presented controversial or differing conclusions that were useful to explore. Always, the objective was to clearly define the issues for field programs by making connections between areas that had not been previously explored and by challenging the myths around maternal and neonatal health and nutrition that have grown over the years.

More recently, we have also begun to report on MotherCare's projects. For example, volume 6 (4) describes the interventions in demonstration projects in Indonesia, Bolivia and Guatemala. Such reports will become more frequent as we go into the next 2-year phase of MotherCare, where we will evaluate our own work for lessons learned.

We hope you have enjoyed *MotherCare Matters* and find it useful for your program or research. In this compendium, we have compiled all issues written over the past five years. For those printed prior to 1994, please write, E-mail or call us. Also, send us any topics you think might be worthy of exploration in a future *MotherCare Matters.*

Keep motherhood safe and joyous,

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MotherCare™ Matters

A QUARTERLY NEWSLETTER AND LITERATURE REVIEW ON MATERNAL AND NEONATAL HEALTH AND NUTRITION

Volume 4, Number 1 April 1994

ANEMIA AND WOMEN'S HEALTH

INTRODUCTION

This is the first volume of *MotherCare Matters* under Phase II of MotherCare. The first phase of MotherCare ended in September, 1993 after nearly five years of operation; the second phase began in October, 1993 and will continue through September, 1998. While previously *MotherCare Matters* has been devoted to reviewing the literature on particular issues of interest for programming in Safe Motherhood, we will be attempting to combine this format with news of ongoing projects during the second phase of MotherCare.

In this volume, two projects supported by MotherCare which addressed the issue of anemia are reviewed. Anemia affects over 2 billion people worldwide, causing tiredness, poor quality of life and low productivity. **For the pregnant woman, anemia can be particularly devastating: if she is severely anemic (<7 g/dl of hemoglobin), it can mean death for the woman and fetus; if she is moderately anemic (7-11 g/dl), it can mean stillbirth or low birth weight for the baby and death for the woman if she suffers another maternal complication. Over half the pregnant women in the world are vulnerable to these consequences because they are anemic.**

Common causes for anemia include nutritional deficiencies–iron, folate, and less frequently vitamin B12; blood loss (menstruation, childbirth, hookworm infestation); infections (malaria, HIV/AIDS); and to a lesser extent, genetic defects (sickle cell, the thalassemias) and metabolic disorders. For the most frequent causes–iron and folate deficiency, malaria, and hookworm infestation–there are interventions that are cost effective and can be provided through a primary health care system.

The two projects reviewed in this volume of *MotherCare Matters* took place in Indonesia and Burkina Faso. The first, in Indramayu Regency, Indonesia, is a village-based iron supplementation scheme which operated through the homes of traditional birth attendants to reach rural women. An information, education and communications (IEC) effort was added to this experimental delivery system after it had been running for several months to see if IEC could increase the proportion of women who took tablets during pregnancy and the number of tablets they took. The IEC effort is explained in detail as there are few references to similar work.

The second project, in Burkina Faso, obtained qualitative and quantitative data related to anemia and behaviors and practices affecting its prevalence. In Burkina Faso, anemia in women is likely to have several causes, including malaria, hookworm and iron-folate deficiency. In preparation for an intervention program, formative research was conducted on women's explanations for illness, particularly illnesses of the blood, dietary preferences and restrictions, and therapeutic responses to ill-health.

MotherCare will be repeating these two types of projects in other countries where anemia is a significant health problem for women and a risk factor for adverse pregnancy outcomes.

The concluding piece in this volume is a report on compliance with iron supplementation programs. This report is a synopsis of a longer paper which examines issues in compliance with iron tablet consumption, and presents evidence that factors such as product quality, socio-cultural issues, barriers to obtaining tablets, and inadequate supplies may play a much larger role in compliance than more commonly cited reasons.

– Marge Koblinsky, Director

THE ALLEVIATION OF MATERNAL ANEMIA IN INDRAMAYU REGENCY, INDONESIA: RESULTS FROM THE MOTHERCARE PROJECT

This article by Abigail Harrison is based on a paper written for MotherCare by Budi Utomo, Pandu Riono, Teguh Budiono, Endang L. Achadi, Gouranga Dasvarma, Mary Jo Hansell, Nancy L. Sloan, James Phillips, David Leon, and Carolyn Hessler-Radelet (Working Paper No. 23, September 1993). The information contained in the working paper was compiled from the final reports on the iron-folate distribution operations research project conducted in Indramayu, Indonesia in 1991-1992.

In Indonesia, anemia is an important and preventable health problem, affecting between 46 and 78 percent of pregnant women (Household Health Survey, 1992). Although the Ministry of Health targeted a reduction in the prevalence of maternal anemia from 74 to 40 percent during its last Five Year Plan, this goal was not achieved. A recent household survey covering all provinces found 63% of all pregnant women anemic (<11g/dl). In particular, the Ministry encountered logistical problems in its efforts to distribute iron-folate tablets to pregnant women, presenting a clear need to establish alternative delivery models. Also, women needed better information about anemia, and the prevalence of anemia and other nutritional problems needed to be better documented.

In conjunction with MotherCare, and with collaboration from the Population Council and the Manoff Group, the Center for Child Survival at the University of Indonesia (CCS-UI) undertook a project aimed at addressing these problems in the Indramayu Regency of West Java. The problem of anemia was thought to be exacerbated by inadequate supply at the village level and high levels of non-compliance among pregnant women in taking iron-folate tablets. Two interventions were designed to address these problems: an alternative iron-folate tablet distribution system which relied on traditional birth attendants (TBAs) to distribute tablets at the village level, using their homes as supply depots; and an information, education and communications (IEC) campaign which provided information about anemia, the need for iron supplementation during pregnancy, and informed women that tablets were available at TBAs' homes.

The Indramayu Project took place between June 1991 and November 1992 with 845 pregnant women participating in the study. The study used the existing health services for implementation of the two interventions. The family health system in Indramayu consists of puskemas (community health centers), auxiliary community health centers, and posyandu (integrated village-level family planning and health posts). Programs to address anemia among pregnant women existed through the posyandu and puskemas prior to the alternative distribution system and IEC campaign. Pregnant women in their last trimester were supposed to receive iron-folate supplements from these health posts and clinics. The policy of the Ministry of Health advises that women take one tablet daily for at least 90 days during pregnancy. For this purpose UNICEF supplied packets of 30 tablets containing 200 mg of ferrous sulfate and 250 mcg of folic acid. But even with these programs, evidence shows that only 33% of pregnant women in Indonesia receive iron-folate supplementation, indicating a problem in distribution of the tablets.

The community-based research project on the nutritional status of women in Indramayu identified two major problems with iron-folate consumption: few women received iron-folate tablets in spite of their distribution to health centers throughout the district; and even where women did receive tablets, "compliance"--or the total number of tablets taken by women during pregnancy--remained low. Two main areas of improvement were identified: an improved distribution system so that more women actually received the pills; and an increase in the total number of pills taken by women during pregnancy. Increasing "compliance" was thought to depend at least in part on understanding reasons why women did not take the pills, and addressing these issues directly. Prior to the Indramayu Project, little was known about local beliefs and practices surrounding the use of iron tablets during pregnancy or about women's acceptance of these tablets. Based on this need, the Indramayu Project began with formative, qualitative research. Outlined in the next article, this research was conducted to explore local cultural factors and other reasons for non-compliance.

An experimental delivery system for the distribution of iron-folate tablets was designed, using TBAs' homes as distribution centers where women could obtain tablets. Also, the supply of tablets was increased to meet the demand generated by the TBAs. This community-based distribution system was added to the existing government system of iron-folate tablet distribution through puskemas and

posyandu in the intervention area of Gabus Wetan between June 1991 and November 1992.

Nine months after the distribution intervention was in place, an IEC campaign was implemented to focus on increasing tablet coverage and consumption. This campaign ran for six months, April - November 1992. This social marketing and health education campaign provided basic information about the need for iron-folate supplementation during pregnancy and the correct dose of tablets. The actual messages targeted to women during this campaign were: 1) why iron-folate tablets are important; 2) how to take iron-folate tablets correctly; 3) how to manage the side effects sometimes experienced with the tablets; and 4) where to get the tablets. These were the areas which seemed to confuse women and often turn them away from taking the tablets. The IEC campaign was conducted in both the intervention area, Gabus Wetan, and a control area, Sliyeg, both sub-districts in the Indramayu Regency, using pre- and post-test measurements.

Outcome variables for the study were defined as: 1) compliance, as measured by the total number of iron-folate tablets taken over the course of pregnancy; and 2) coverage, as measured by the proportion of women taking any tablets in the week prior to the interview. To analyze the data, bivariate, linear regression and multiple regression analyses were conducted using SPSS-PC.

Results showed that the alternative delivery system significantly increased the availability, coverage and consumption of iron-folate tablets. Nearly 92% of pregnant women were reached with iron-folate tablets in the intervention area, compared with 53% in the control. Women in the intervention area took approximately 41 more tablets during pregnancy than women in the control area. These differences are highly significant. As a result of the social marketing campaign, women in the control area, Sliyeg, took an average of 24 more tablets during pregnancy (an increase from 24 to 48 tablets) after the campaign than before, with the difference being highly significant. The increase, due to the IEC campaign, was less marked in the intervention area, Gabus Wetan (where the alternative delivery system had already increased consumption) with a rise in consumption from 62 to 66 tablets versus the 62 tablets achieved by TBA community-based distribution alone. Tables 1 and 2 below illustrate these results.

Table 1. Effect of TBA Community-Based Distribution Model on Iron-Folate Tablet Consumption

	Intervention	Control
Outcome	**Gabus Wetan**	**Sliyeg**
Tablets/Month	12.8	4.8*
Tablets/Pregnancy	62.0	24.0*
% Women taking iron-folate	92.5	51.1*

* p<.001

Table 2. Effect of Communications Intervention on Tablet Consumption

	Intervention		Control	
	Gabus Wetan		**Sliyeg**	
Outcome	**Pre ***	**Post**	**Pre ***	**Post**
Tablets/Month	12.8	14.8**	4.8	10.6***
Tablets/Pregnancy	62.0	65.7**	24.0	47.7***
% Women taking iron-folate	92.5	98.0**	51.1	86.0***

* The starting point for the IEC campaign occurred after the alternative delivery system had been in place for nine months. Thus, the "pre" measurements for the communications component and the measurements for the effect of the service delivery model (intervention area) are the same.
** p<.05
*** p<.001

After both campaigns, women in the TBA intervention sub-district, Gabus Wetan, took about 4 tablets more per month than those in Sliyeg, the control sub-district. Women in Sliyeg reported taking a total of about 48 tablets during pregnancy, while women in Gabus Wetan reported taking about 66 tablets during pregnancy, demonstrating improved compliance. Coverage also increased, with 98% of all women in Gabus Wetan reporting that they took iron-folate, and 86% of all women in Sliyeg. The differences between pre- and post-intervention are mediated by reducing the proportion of women who took no iron-folate tablets during pregnancy. The improvement in average monthly consumption or total consumption of tablets during pregnancy was limited in women who already reported taking tablets, indicating that the communications campaign had the greatest impact on women who did not initially take tablets. In addition, women who said they consumed 1-2 tablets per week during pregnancy delivered babies 172g heavier and 1 cm longer, on average.

These results indicate that a communications campaign or TBA distribution alone is effective in increasing the proportion of women receiving iron tablets (coverage) and the number of tablets they consume (compliance) which, in return, has a positive impact on birth weight and length of the baby. The IEC campaign was clearly most effective in the control area, Sliyeg, where the alternative delivery system was not implemented. To surpass the effects of better distribution, communications campaigns need to make further efforts to increase the number of tablets taken by women.

COMMENTARY

Since ensuring an adequate and constant supply of iron-folate pills to pregnant women is the major obstacle in most supplementation programs, this study has important implications for improving the delivery of iron-folate supplements to pregnant women. It shows that providing iron-folate pills at the community level through traditional birth attendants (TBAs) can dramatically increase the number of women who receive and take iron-folate pills. The study also shows that an IEC package by itself can be effective in increasing coverage and consumption of iron-folate supplements even with no significant improvement in the delivery system. This has particular relevance for countries where TBAs do not exist and access to health services is limited.

Lessons learned from the Indramayu study are that more attention needs to be given to maximizing compliance with iron-folate supplementation since the overall number of these tablets taken by pregnant women in both the control and experimental areas was only two-thirds that recommended by the Government of Indonesia. More specific and probably different IEC messages will need to be developed for areas where TBAs are actively distributing iron-folate versus areas where iron-folate is obtained by more conventional means.

In the planned expansion of this study, several approaches may be warranted:

- develop a more sophisticated (or different) IEC package for women receiving iron-folate pills from TBAs;

- better educate health care providers at all levels about the importance of distributing iron-folate pills and improve their counseling skills to convince women they should take these supplements, help them manage side-effects, make them more empathetic to patient needs, and discuss all supply points available for obtaining refills;

- since refilling supplies for both women and TBAs was problematic, new delivery depots need to be identified in both the public and private sectors to make access more convenient;

- relate compliance and iron status to birth and maternal outcomes at delivery.

AN INFORMATION, EDUCATION AND COMMUNICATIONS (IEC) CAMPAIGN OF IRON-FOLATE TABLETS IN INDRAMAYU, WEST JAVA

This article, by Deborah Gordis, is excerpted from the MotherCare publication Applying Social Marketing to Maternal Health Projects. MotherCare/The Manoff Group, 1993.

This piece describes in detail the formative research conducted prior to the design and implementation of the IEC component of the Indramayu project, detailed in the previous article. The details of and findings from the IEC campaign are also presented here.

At the start of the project, formative research, including focus group discussions, in-depth interviews and behavioral trials (product and concept testing), was conducted with pregnant women, their husbands and elder female family members, traditional birth attendants (TBAs), and midwives and doctors of the formal health sector. This research was undertaken to develop the communications campaign based on:

- ideas about anemia and blood during pregnancy;
- information on pregnant women's understanding and use of iron-folate tablets;
- acceptability by pregnant women and TBAs of distributing iron-folate tablets through TBAs; and
- appropriate channels of communication to distribute information and messages about the importance of iron-folate tablets, how to consume them and where to get them.

Product trials were conducted with pregnant women to determine the palatability of iron-folate tablets and women's ability to tolerate a daily dose as part of their daily routine.

Research indicated that two major obstacles to iron-folate supplementation efforts were limited supply and access to tablets and limited knowledge about their use. The research also reconfirmed that TBAs are important sources of support for pregnant women. Several findings from the research aided in the design and development of the social marketing program:

- Maternal anemia is not perceived as a priority health problem by pregnant women, their families, or their traditional and formal health care providers.

- Factual knowledge of the need for and benefits of iron-folate tablets is low at the community level and among traditional and formal health care providers.

- Pregnancy and related problems are not discussed openly in the family or community. Pregnant women's activities outside the home and rice field and their exposure to mass media other than radio are limited.

- Side effects, unreliable supply and other undesirable characteristics of iron-folate tablets are common causes for discontinuing consumption. Social support from influential family members and health care providers could increase compliance with consumption.

- Distribution of iron-folate tablets through TBAs' homes (pregnant women visiting the TBA's home) rather than house-to-house (TBAs visiting the pregnant woman's home) was more acceptable by pregnant women and by TBAs. However, the community does not perceive TBAs as a source of information or services offering formal health care; some TBAs are also reluctant to become distributors of "modern" medicine.

- Household trials with pregnant women revealed that women took the iron-folate tablets with food (either a snack or during a meal) to mask the taste of the tablet but also as a reminder to take the tablet.

Based on the research results, a multi-media plan was developed to promote an understanding among pregnant women, their families, and their traditional and formal health care providers of the importance of taking iron-folate tablets, how to take them and where to get them. Specifically, the plan included the following:

- All campaign materials featured Ibu Sehat, a healthy pregnant woman who takes iron-folate tablets each day. Women recognized and responded positively to this symbol of the campaign. Messages also included instructions on iron-folate tablet use, management of side effects, and supply sources, including the promotion of TBAs as distributors (in Gabus Wetan only).

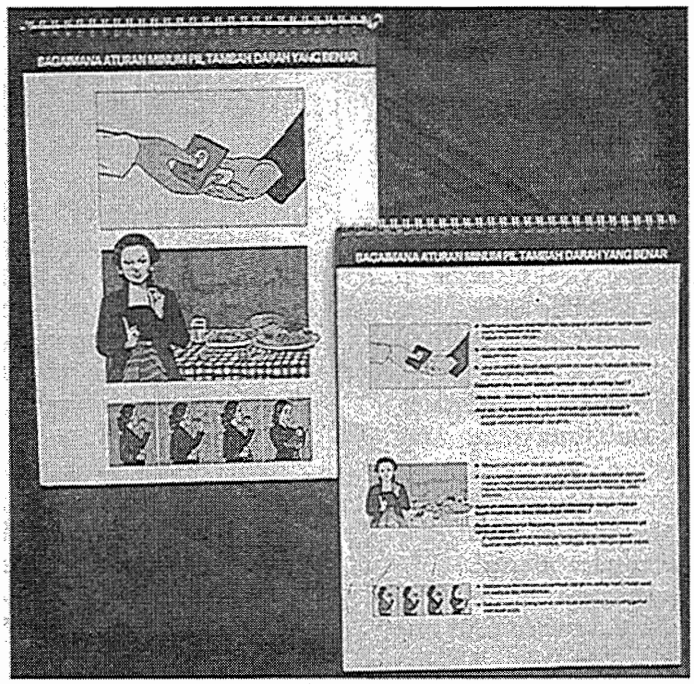
- A counseling flipchart for midwives, community health volunteers and TBAs to better inform pregnant women of the importance of combatting anemia, why iron-folate tablets would help, what side effects to expect initially and to continue to take them even if they feel better, and where to receive more tablets. See Photo 1 below.

- For easier distribution by TBAs, repackaging of tablets into small plastic sealable bags with the project's promotional sticker on the outside.

- Scheduled periodic community meetings with men and community leaders to talk about and distribute leaflets on the importance of maternal health and, specifically, iron-folate tablet consumption.

Messages were designed in accordance with formative research findings and pretest results of the materials. The project's "spokesperson", "Ibu Sehat," appeared in the print and radio material as a

PHOTO 1: COUNSELING FLIPCHART FOR MIDWIVES AND TBAs, INDRAMAYU



- Take-home action cards for pregnant women to remind them to take iron-folate tablets daily.

- Posters, banners, stickers, tin plates, and balloons as special event promotional items, as well as markers for iron-folate tablet distribution points (e.g., health centers, community health posts, TBA homes).

- Radio advertisements featuring "Ibu Sehat" and her supportive husband summarizing the rationale for pregnant women to take iron-folate tablets and where to get them.

- Scheduled monthly "Iron-Folate Tablet Awareness Days" at health centers and community health posts.

unifying force of the program; use of such a figurehead ensured continuity and a rallying point among the variety of activities under the program. See Photo 2 on the following page.

Monitoring activities included field observations, in-depth interviews and examining data from an operations research survey conducted among pregnant women. Initial observations revealed interesting programmatic issues:

- Iron-folate tablets in one project site became discolored and began to crumble after being distributed to pregnant women. In an attempt to reduce this deterioration, small plastic bottles (donated by Bristol-Myers Squibb) were given to pregnant women to contain their tablets.

PHOTO 2: POSTER OF IBU SEHAT, THE "HEALTHY MOTHER"

- Midwives stated that using the counseling flipchart with pregnant women would reduce the midwife's own clinical credibility for two major reasons:

  –overtly referring to illustrated cards may give the impression that midwives themselves need help in understanding anemia and iron supplementation; and

  –using counseling cards that are also used by TBAs and community health workers "reduces" the midwife to the level of the other health care providers who are not as well trained.

  As a result, midwives and community health workers had stopped using flipcharts.

Several lessons learned may contribute to the improved design of social marketing programs and health communications materials:

- Qualitative research can help define overall program strategy, i.e., distribution systems, in addition to factors important in health communications. In this case, selection and testing of TBA networks was critical to resolving the iron-folate tablet distribution problem.

- Emphasizing signs and symptoms of anemia does not appear to be necessary in order to increase coverage; women seem willing to take the supplement if provided.

- The product being promoted must be tested for shelf-life, palatability and other determinants of quality.

- Promoters of messages must be properly and thoroughly oriented to the purpose of the messages and the use of materials. Conduct early, frequent monitoring to check on materials use and message comprehension.

- To maximize the impact of the health communications component, qualitative research should be conducted before implementing a distribution system and again after that system has functioned over a period of time. This will permit the development of a communications campaign which complements and enhances the role of the distribution system.

The Indramayu project is only one of the pilot projects to help combat anemia in Indonesia. The Government has indicated interest in reproducing some of the health communications materials designed in Indramayu for other areas.

IDENTIFYING STRATEGIES TO CONTROL ANEMIA AMONG WOMEN OF REPRODUCTIVE AGE: FINDINGS OF AN IN-DEPTH STUDY IN BOBO-DIOULASSO, BURKINA FASO.

This article, by Nicolas Meda, Bernadette Kanki, Simon Cousens, and Wendy Graham of The London School of Hygiene and Tropical Medicine, is taken from a final report on the Burkina Faso study.

It has been estimated that in Africa over 50 percent of pregnant women and half of non-pregnant women may be anemic (ACC/SCN, 1992). Serious anemia in pregnant women has been associated with multiple adverse effects, including increased risk of maternal death (Winikoff, 1988; Danforth, 1982) and excess fetal pathology (Garn et al., 1981). In a recent review of the effectiveness of antenatal care, Rooney (1992) concluded that the prevention and treatment of anemia should be a priority and that routine iron (and folate) supplementation is probably warranted in areas where the prevalence of anemia and iron deficiency is high.

Burkina Faso in West Africa is one of the poorest countries in the world with one of the highest maternal mortality ratios (810 per 100,000 live births) (World Bank, 1993). Reducing this excessive mortality is regarded as a high priority by both health policy makers and health professionals (Ministère de la Santé, de l'Action Sociale et de la Famille, 1991). The contribution of anemia to this high maternal mortality is probably substantial, since obstetric hemorrhage is a common cause of maternal death (Ouedraogo, 1989). However, no studies of the prevalence of anemia among women of reproductive age in Burkina Faso have ever been published.

In 1993 and with the support of MotherCare, a study was carried out in Bobo-Dioulasso, the second largest town in Burkina Faso, with the aim of providing information which would assist in the development of an effective and acceptable program to control anemia among women of reproductive age. The three essential elements of information needed for such a program are: a knowledge of the magnitude and consequences (medical, social and economic) of the anemia; a knowledge of its etiology; and a knowledge of the available preventive and control measures, their medical and cost-effectiveness and, above all, their acceptability to the population. Thus in addition to determining the prevalence of anemia, the study in Bobo-Dioulasso also explored local perceptions of health, illness and healing, particularly among women during pregnancy and lactation, investigated when, where and why women of reproductive age have contact with existing health services, and looked into the acceptability of supplementation as an approach to the control of anemia.

Burkina Faso is a landlocked country of some 9½ million people, situated at the southern edge of the Sahel Desert. Conventional indicators rank it as one of the poorest countries in the world, with an estimated gross national product (GNP) of $290 per capita in 1991 (World Bank, 1993). A crude birth rate of 47 per 1000 population and a total fertility rate of 6.5 are among the highest in the world (World Bank, 1993). The town of Bobo-Dioulasso is situated in the south-west of the country in a savannah zone. Like other towns in West Africa, Bobo-Dioulasso is expanding rapidly, with an estimated annual population growth rate of 6.7%, giving a figure for the population of the town in 1993 of some 370,000 people (Ministère de la Santé, de l'Action Sociale, et de la Famille, 1991). There are some sixty ethnic groups in Burkina Faso, all of which are represented in Bobo-Dioulasso, and at least another thirty ethnic groups from all over Africa have been recorded as residents of the town. Climatically, the year in Bobo-Dioulasso may be crudely divided into three seasons: the dry season from October to February, the hot season from March to May, and the rainy season from June to September. This latter season is the "hungry" season when food supplies are at their lowest before the new harvest and when malaria transmission is at its highest. The fieldwork for this study was performed in April and May, the hot season.

A variety of approaches to health care and healing exist in the town and many options for treatment are available. These include approaches which derive from local traditions as well as those imported more recently, commonly referred to as "the medicine of the whites". In the "white" sector there are 26 health facilities, 13 of which are government run, and 13 private. Bobo-Dioulasso is the site of one of two "National Hospitals" in the country, the "Centre Hospitalier National Sanou Souro" (CHNSS). The hospital acts as the referral center for the west and south-west of the country. In addition to the hospital there are seven fixed government health facilities that offer maternal and child health services (SMI), including antenatal care, and 5 mobile clinics which cover the peripheral areas of the town. At present, anemia control activities consist of an examination of

the conjunctiva of pregnant women attending health facilities for antenatal care. The prescription of iron and folate supplements is uncommon and "compliance" with such supplementation has never been evaluated in Burkina Faso.

The study combined both quantitative and qualitative research techniques. A cross-sectional survey of women of reproductive age (15 to 49 years) was conducted in Bobo-Dioulasso, using a cluster sample design. Data collection was carried out by female health assistants and included the administration of a structured questionnaire, an assessment of the woman's anthropometric status (height, weight and mid-upper arm circumference), measurement of hemoglobin levels using the Hemocue B-Hemoglobin System, and assessment of conjunctival pallor. This survey was completed within five-weeks and a total of 251 women were recruited to the study. The qualitative component consisted of a series of semi-structured, key informant interviews with women of reproductive age, with local herbalists, and with government health workers. A total of 37 in-depth interviews were conducted by a Burkinabé sociologist (BK), and topics covered included explanations for illness, particularly illnesses of the blood, dietary preferences and restrictions, and therapeutic responses to ill-health. The interviews with the women focused on their experiences of motherhood (pregnancy, delivery and the problems associated with these events); knowledge and treatment of those illnesses considered most common; the importance of nutrition; dietary practices, preferences and restrictions; and experience and acceptability of iron supplementation.

The prevalence of anemia was high (> 50%) overall in this population of women and was very high among pregnant women (> 70%). The vast majority of anemic women had moderate anemia (Hb > 7.0 g/dl). However, as many as a third of women in the latter stages of pregnancy may have hemoglobin levels below 9 g/dl. Utilization of government health services is very high in this urban population, with the vast majority of women using antenatal care services and three-quarters using government delivery services. Eighty percent of women with Hb levels below 9 g/dl had contact with government health services in the 3 to 4 months prior to interview. All three women with severe anemia had contacts during this period.

From both the in-depth interviews and those conducted during the cross-sectional survey, it is clear that the maintenance of and the recovery to good health is considered very important by people in Bobo-Dioulasso and merits substantial effort by the individual concerned and their family. Furthermore, health is perceived to be intimately linked with, indeed depends upon, the quantity and quality of blood in the body. The concept that someone may be "lacking in blood" ("djoliban") appears to be universally understood (although the different local terms used to describe this state are not universally recognized). The signs and symptoms of this condition correspond closely to those associated with anemia. This condition ("djoliban") is regarded as very serious and potentially fatal. The women interviewed in this study identified four groups of causes of "djoliban": blood loss (heavy menstruation, blood loss at delivery, antepartum or postpartum hemorrhage); hard (excessive) work; another illness; and poor diet. Diet is linked with "djoliban" in so far as some foods (meat, fish) "give blood". However, since everybody eats these foods to one degree or another poor diet alone is not considered to be a sufficient cause of "djoliban".

There are numerous dietary restrictions and recommendations directed towards pregnant and lactating women. In addition to these cultural restrictions, there are a number of other foods which women find difficult to eat/keep down, especially during the first months of pregnancy. Among the restrictions, perhaps the one that may be most closely linked with anemia is that forbidding the consumption of acid foods (oranges, lemons, etc.) during pregnancy. Women also commonly reported being physically unable to eat meat during pregnancy, especially early on. The restriction on acid foods, if followed, in conjunction with non-consumption of meat and fish during pregnancy, could lead to low levels of iron absorption, particularly in a diet based largely on milled cereals.

COMMENTARY

The findings from the study in Bobo-Dioulasso have relevance to the assessment of anemia at the individual and community levels, for the delivery of anemia control strategies, and for possible approaches to control.

Anemia control at present is often based upon an assessment of conjunctival pallor at antenatal consultations. The overall sensitivity of this method for detecting anaemic women was found to be very low (16%) in the Bobo-Dioulasso study. The sensitivity for the detection of Hb levels below 9 g/dl was, however, rather better (around 60%). The HemoCue was found to provide a highly acceptable method for detecting anemia in this population. The refusal rate among women surveyed in the community was very low (less than 3%) and would probably be even lower among women coming to health facilities for antenatal or other care.

Because of high prevalence of anemia, it is recommended that all pregnant women in developing countries receive iron-folate supplements. Diagnosis of anemia is recommended on a referral basis for women who are suspected to be severely anemic or are at high risk for other complications, to ensure that hemoglobin levels reach safe levels before delivery. Because of its initial cost and the need for a constant supply of imported, disposable and relatively expensive cuvettes, the HemoCue would probably not be the most practical diagnostic tool in most developing countries.

An anemia control program based on existing health service contacts has the potential to reach the majority of women at risk of anemia, particularly if all contacts are utilized. However, anemia control should not be restricted to iron supplementation. While it is often assumed that the most important cause of anemia is iron deficiency, Fleming (1969), reporting from elsewhere in West Africa (Ibadan, Nigeria), found that only 2 out of 248 anemic women were iron deficient. Hemolysis due to malaria infection, and folate deficiency were more common causes of anemia. In areas where malaria is endemic, prophylaxis for and treatment of malaria is important for all women during pregnancy. In addition, all iron tablets should contain folic acid to make sure that anemia due to folic acid deficiency is also addressed. Unfortunately, it was not possible to analyze the etiology of anemia in the study in Bobo-Dioulasso.

As regards possible approaches to controlling anemia caused by iron deficiency, it is clear from the study that dietary advice alone is likely to have little impact on anemia among women in this population. Many pregnant women found food sources rich in iron, such as meat and fish, difficult to "keep down" and, in any case, these foods represent something of a luxury.. Traditional beliefs counselled pregnant women against eating fruits rich in ascorbic acid (vitamin C). Furthermore, local perceptions of "djoliban" did not admit that diet alone could explain a "lack of blood". Dietary changes alone cannot, therefore, cure such a state. A medicine is perceived to be needed to cure a state such as "djoliban". Women tested with the HemoCue and found to be anaemic appeared to find iron supplementation acceptable, at least over the first few days, when their anemia was explained to them using local concepts and the possible side-effects of iron tablets described. If iron (and/or folate) deficiency is the major cause of anemia among women of reproductive age, then a control program based on supplements delivered through existing health service contacts could, potentially, be very effective. In such circumstances consideration should be given to combining the iron supplements with vitamin C supplementation, to combat the effects of a diet based on cereals and a traditional restriction on the consumption of vitamin C-rich fruits during pregnancy. Attention should be given not only to pregnant women but also, in particular, to those in the postpartum period, and the control program should be integrated with postnatal care services including child immunization and family planning. Dietary advice given in conjunction with a "medicine" may be better accepted and followed than dietary advice alone.

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DETERMINANTS OF COMPLIANCE WITH IRON SUPPLEMENTATION

This article was written by Rae Galloway, based on a paper written by her for the World Bank, and presented at the June 6-8, 1990 ACC/SCN meeting on "Controlling Iron Deficiency" and a forthcoming paper in Social Science and Medicine by Rae Galloway and Judith McGuire.

Because the majority of pregnant women in developing countries are anemic, it is recommended they take iron-folate supplements from the fourth or fifth month of pregnancy (ACC/SCN, 1991). In areas where anemia is moderate to high, women should take two pills per day (containing 60 mg. of elemental iron and 250 mcg. of folic acid each); in areas where anemia is mild women should take one pill per day (ACC/SCN, 1991). Unfortunately, the practice falls far short of the recommendation and anemia, caused mainly by iron-folate deficiency, continues to be a life-threatening condition for over 60% of pregnant women in developing countries (DeMaeyer & Adiels-Tegman, 1985).

Unlike deficiencies in vitamin A and iodine which can be delivered on a six-monthly and bi-yearly basis, respectively, prophylaxis and treatment with iron-folate requires daily ingestion. This greatly complicates compliance with iron supplementation. Because compliance refers to the behavior of the patient, there may be several ways to alter the form of iron-folate supplements to make taking them more attractive to women.

As is true with any medication, the fewer the pills, the more likely the regimen will be followed and completed. Dosage can be changed to enhance or mitigate positive and negative side effects. In the case of iron, unpleasant side effects (diarrhea, constipation, vomiting, black stools, etc.) can accompany treatment with supplements and this often deters women from continuing to take their pills, especially if they haven't been informed about how to manage side effects (Favin and Griffiths, 1991). On the positive side, however, as hemoglobin levels rise women may feel better and start demanding iron-folate pills. The number of pills and dose needs to be correct to ensure this positive outcome.

Often, the form of the iron can affect compliance (Morrow, 1990; Favin and Griffiths, 1991). Some women may feel that an injection is more powerful than a pill and thus put less importance on taking a pill. Pills that crumble in humid climates may be deemed ineffective and not worth taking. Improved packaging, such as blister packs or bottles, may be needed to address this problem. In some cultures, the color of the pill can improve its acceptability. A red pill may be equated with making the blood stronger while a white or brown one has no meaning. Taste is also an important consideration affecting compliance. In some cultures a bitter taste is needed to make the treatment effective; in others bitterness may mean that women will not take the pill because it tastes bad. In many countries, women seem to prefer sugar-coated pills because they are more palatable.

Health care providers often cite these behavioral factors when examining reasons why women do not take iron supplements (Galloway and McGuire, forthcoming). When asked why pregnant women do not take iron-folate supplements, most health care providers claim that women stop taking supplements due to side effects, bad taste, color or the fact that there are too many pills to take. However, the literature suggests that side effects are not a serious or insurmountable problem for the majority of women. **Instead, the main problem women have is obtaining adequate supplies of iron tablets.**

In a study in Burma (Charoenlarp, et al., 1988), only 3% of women stopped taking iron supplements due to side effects. The main reason women stopped taking iron was premature delivery (5-15%). In a study by the same authors in Thailand, women did experience side effects but did not stop taking their pills for this reason, particularly if they had been coached beforehand that side effects would subside if they continued to take their pills. In one area, side effects were only experienced because the quality of the pill deteriorated, but this did not keep women from complying with their treatment plan.

From the limited number of available studies and evaluations of other iron supplementation programs, the overwhelming reason why women say they don't take iron-folate supplements is that they don't receive them in the first place or can't obtain refills. An example of this is the Indramayu study, explained in greater depth at the beginning of this issue. By utilizing traditional birth attendants (TBAs) to distribute iron-folate supplements, the study was able to increase the number of women taking pills (coverage) and the number of pills they took (compliance) although the total number of pills women took fell short of what is recommended by the Government of Indonesia. When women were asked why they stopped taking their pills most stated they were not able to obtain refills. TBAs also had problems replenishing their supplies because they could not get to the health center, usually because they could not pay for transportation costs. In the control area where women obtained pills from doctors, midwives and other health care providers, the women stated that the major reason they did not take iron-folate was that they never received the pills.

The 1985-86 evaluation of the Indian iron supplementation program (ICMR, 1989) shows similar findings, with 80% of pregnant women never being offered iron-folate pills. Of the 20% that did receive supplements only 4% refused to take the pills. Twenty-five percent of those who received pills discontinued taking them due to problems with refilling supplies (60%), side effects (12%), and other reasons (29%).

The reason supplies of iron-folate are not reaching women varies from area to area. In many cases, health care providers and policy makers are not aware that iron-folate deficiency is sufficiently important to make sure that supplies are adequate at all levels. In the India evaluation when district and primary health care (PHC) medical officers were interviewed 36% and 62%, respectively, had incomplete or no knowledge of the iron supplementation program and only 47-60% knew who the beneficiaries were. When asked if supplies were adequate, 84% of district medical officers reported that supplies were adequate when in reality only 40% of the districts could meet the actual number of pills needed for beneficiaries.

For the health care providers (HCPs) who do give iron-folate pills to women, too many of them assume that the behavior of women is the reason they are not complying. In the India evaluation, 39% of PHC medical officers stated that beneficiaries had acceptance problems (side effects, taboos, etc.); however, only 4.7% of beneficiaries stated that they had acceptance problems. Health care providers at levels closer to the community had better knowledge of acceptance problems: 12% of auxiliary nurse midwives stated that beneficiaries had acceptance problems compared with 4.7% of beneficiaries.

Physiological and emotional reactions are important determinants to taking iron-folate supplements; however, they are not, at this point, the major reason why women in developing countries are not taking their pills. **In fact, before we are able to address the behavior of patients, we need to ensure that health care providers and policy makers believe that anemia is an important enough problem to make iron-folate pills available at all levels of the health system and identify alternative delivery routes.** After supply problems are addressed, health care providers will need to make sure that the quality and form of the product delivered are appropriate and continue to create demand for iron-folate pills by counseling women about the importance of taking the pills and how to manage side effects, should they occur.

COMMENTARY

It is clear that there are some major challenges in improving iron-folate supplementation programs. The first major challenge is to make sure iron-folate pills are available at all contact points in the health system. It may also be necessary to identify alternate supply points in the public and private sectors.

The second challenge is to generate demand for iron-folate by making women aware of its

importance and delivering a quality product and services. This means that health care workers need to optimize their one-on-one counseling skills and continue to follow up with women to help them solve any problems they might be having in continuing to take iron supplements. The challenges to reducing anemia will need commitment from health care providers at all levels, politicians, and the private sector. Clear policies are needed to guide practices to avert high prevalences of nutritional anemia. In order to have a wider impact, the possibility of supplementing adolescent girls should also be investigated. Suggested ways to optimize pill taking and the effectiveness of iron-folate supplementation for women are:

• Make supplies available at all levels of the health system by estimating the proper number of pills, providing buffer stocks, allowing non-central government and competitive procurement practices, providing alternate points of delivery through both public and private sectors;

• Make sure the size of the dose, the number of pills taken per day, and length of treatment are balanced to optimize convenience in taking pills and maximize hemoglobin levels;

• Provide supplementation in a culturally acceptable form (pill, injection, elixir), packaging, color, smell, and taste;

• Ensure the quality of the product so it doesn't disintegrate due to heat, humidity, etc. This may require providing supplies more frequently and/or using special packaging;

• Provide a quality service by training health care providers to improve their counseling skills and empathy, reduce waiting lines at clinics, give appointment reminders, expand hours of operation, and provide multiple language and childcare services;

• Give women information on how to manage side effects should they occur either by taking supplements with food (preferably those containing vitamin C) or reducing the size of the dose. Women should also be assured that side effects will probably subside and are not serious, or helped to manage side effects should they persist;

• Inform women about the benefits of taking iron (they will feel better, have improved capacity to work, reduced sickness, a safer pregnancy and delivery, and a healthier baby);

• Give incentives to women for practicing preventive behaviors such as taking iron supplements.

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MotherCare is now in its second phase (1993-1998). After successfully completing demonstration projects in Bolivia, Guatemala, Nigeria, Uganda and Indonesia, along with several research projects, in Phase I (1989-1993), our new mandate has been modified. We will scale up our efforts to reduce maternal and neonatal mortality and related morbidities, and improve the health of women of reproductive age and newborns.

The MotherCare staff now includes several new members. With this volume, we introduce Bill Brady, Sexually Transmitted Disease Advisor, who will serve as technical editor for a forthcoming issue of *MotherCare Matters*; Eufemia Campagna, Staff Associate, who will serve as Production and Distribution Coordinator for *MotherCare Matters*; Milton D'Silva, Accountant; Rae Galloway, Nutrition Advisor, whose article on compliance with iron supplementation appears in this issue; and Abigail Harrison, Program Associate, co-editor of this issue.

Returning to MotherCare are Marge Koblinsky, Project Director; Colleen Conroy, Deputy Director; Patricia Daunas, Program Associate; Mary King, Administrative Officer; Barbara Kwast, Maternal/Neonatal Health Advisor; and Kim Winnard, IEC Advisor.

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MotherCare™ Matters

A QUARTERLY NEWSLETTER AND LITERATURE REVIEW ON MATERNAL AND NEONATAL HEALTH AND NUTRITION

HEALTHY PREGNANCY, SAFE DELIVERY— THE MOTHERCARE EXPERIENCE

In the 1980's, research data revealing that each year 500,000 women worldwide die during childbirth (95% in the developing world) shocked policy makers at international and national levels. Over 90% of the causes—hemorrhage, hypertensive disorders of pregnancy, puerperal sepsis, obstructed labor, and septic abortion—were known to be preventable. The World Health Organization estimated that safe motherhood programs could reduce maternal mortality by half by the year 2000. In so doing:

- Acute pregnancy-related morbidities suffered by over 50 million women, as well as chronic long-term disabilities (such as fistulas or prolapse) now burdening millions more women, could also be prevented or reduced in number and severity.
- Seven million annual perinatal deaths could be reduced by one third to one half through improved management during delivery.
- Infant mortality could potentially decline by one fifth to one third through the reduction of consequent early neonatal deaths.
- The growth and development of children could be improved by reducing the number—24 million in 1993—of low birth weight babies born annually, as well as by reducing the incidence of other problems occurring during the perinatal period (for example, cerebral palsy, affecting over 2 million children annually).

In 1988, recognizing the magnitude and seriousness of these problems and the complementarity of safe motherhood programs to ongoing projects in family planning and child survival, the United States Agency for International Development developed a ten-year maternal and neonatal health and nutrition project known as MotherCare to improve pregnancy outcomes and better the health and nutrition of women of reproductive age and their newborns in developing countries.

The MotherCare Approach

The coordination of services between the community and a referral hospital is essential to bringing health services closer to women and their newborns and getting women and newborns to services quickly when obstetrical or neonatal complications arise. Explicit policies are needed to sanction and regulate this coordination of services. Other inputs include:

- the means to communicate between the levels (telephones or two-way radios);
- transportation for women or infants with complications and for providers in order to supply outreach and supervision;
- case management protocols and equipment and supplies at each level.

Three strategies guide MotherCare's efforts in all country settings to improve pregnancy outcomes and promote healthy women and newborns:

Improve services by upgrading the ability of providers to counsel and communicate with clients and to manage obstetrical and neonatal complications through basic and refresher training; fostering supportive management and supervision; ensuring continuous logistics and supplies; and establishing efficient and useful monitoring and evaluation.

Affect behaviors through social marketing by increasing awareness of the health and nutritional problems of women and newborns; promoting positive attitudes among providers towards their clients; and heightening the awareness of managers, program officials and policy makers of the consequences of inaction and options for intervention to improve maternal and neonatal health.

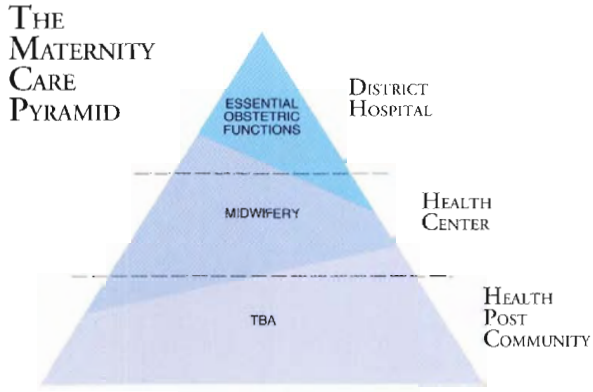
Enhance policy formulation that will strengthen program commitment, including budgetary allocation; improve coordination among the levels of services to respond to women's needs with a more culturally sensitive approach; and ensure appropriate delegation of responsibility to staff at the peripheral level.

Improving Services

The major killers of pregnant women in developing countries are hemorrhage, hypertensive disorders of pregnancy, puerperal sepsis, unsafe abortion, and obstructed labor. The 30-40% of women who encounter complications during pregnancy and delivery need to be attended by doctors and midwives in health centers or referral facilities located as close to the people as possible. The most serious problems (9 to 15% of all pregnancies) require hospital support. Facilities must have adequate equipment, drugs and supplies along with skilled personnel to provide high quality obstetric care. If these are not available, people simply will not use these services.

The maternity care pyramid represents a schematic model of three levels of a country's district health system where specialized midwifery skills extend into the community and some essential obstetric functions (EOF) are available at the health center level.

Essential obstetric functions include surgical obstetrics, anesthesia, medical treatment,



Source: WHO Document. "Human Resource Development for Maternal Health and Safe Motherhood." Report of a Task Force Meeting, Geneva, April 1990. MCH/HRD/90.1

blood replacement, manual procedures and monitoring of labor, management of women at high risk, family planning support and neonatal special care. All health workers, from specialist to traditional birth attendant, are part of the maternity care team with the registered midwife acting as the linchpin. The active and informed participation of the community is indispensable to the success of a maternal and neonatal health and nutrition program. Unfortunately, the distances separating families from the first referral services with EOF are intensified by transportation and communication problems, as well as cost, cultural differences, and varying perceptions of need.

The complete maternity care pyramid is necessary to reduce mortality. While there is ample evidence that maternal mortality is lower among women who receive prenatal care compared with those who do not, prenatal care seems to be increasingly perceived as a passport to safe birth both in the clients' and many health professionals' minds.

Prenatal care in addition to labor and delivery, postpartum and neonatal care and family planning constitute the essential components of a community obstetric service; all components must receive balanced attention.

MotherCare has worked with countries at all levels of the maternity care pyramid. Improvement of services has been attempted through integration of the following interventions:

- Training at all levels, including training TBAs in safe delivery techniques and in recognition and referral of obstetrical complications complemented by the training of district-level physicians and midwives in life-saving skills;
- Improvement of existing facilities through site assessments and inventories of equipment and supplies followed by memoranda of understanding with governments concerning the improvement and maintenance of sites to support programs effectively;
- Extension of services into the community through community participation. An example is the establishment of birthing huts where trained midwives can work side by side with TBAs. In areas with poor infrastructure, working with the community to select and train community members who can link women with existing services;
- Strengthening of referral links from the community to the hospital level through two-way radio, subsidized local transport or transportation reimbursement schemes;
- Supervision, monitoring and evaluation through the development of protocols for management of obstetrical and neonatal complications at each level of care;
- Maternal and perinatal death and complications audits that bring hospital, health center and community members together to determine barriers to and options for improving services.

TANJUNGSARI, INDONESIA:
COMMUNITY-BASED BIRTHING HUTS

While Indonesia has been successful in lowering fertility through family planning, maternal mortality remains high at 450/100,000 live births. A study conducted in the West Java subdistrict of Tanjungsari (population 90,000) in 1988-89 revealed that most maternal deaths occurred due to delays in obtaining services for obstetrical emergencies. The three most common reasons for delay reported by women and health care staff were 1) delays by pregnant women and their supporters (husbands and traditional birth attendants) in making timely decisions to seek a higher level of care; 2) delays in reaching an appropriate referral facility due to transportation problems, distance and cost and 3) delays in receiving appropriate care at the facility due to inadequate equipment and staff skills.

The University of Padjadjaran, with technical assistance from MotherCare, developed an operations research project to address these issues of referral and attendance for emergencies. Birthing huts were established in 10 of the 27 villages in Tanjungsari, serving a population of 37,000, where women could receive prenatal care, screening, referral and normal delivery services and which had access to emergency care via two-way radios and ambulances.

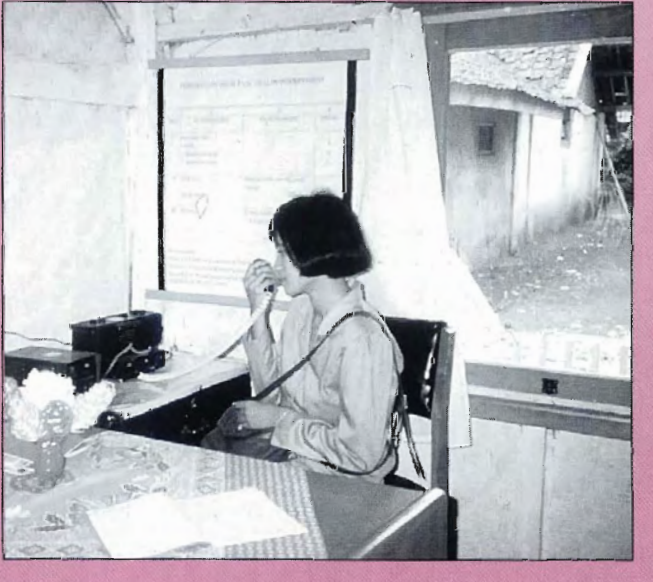
Formative research was undertaken to assess village women's awareness of and attitudes towards the birthing huts and to provide the basis for developing a health communication strategy to increase timely recognition of danger signs and appropriate use of services. The findings revealed an ambivalence about the birthing huts, a strong preference for home delivery and a high degree of misinformation about the warning signs of obstetrical complications.

A health communication campaign was launched to educate the community about the proper response to danger signs and about the benefits offered by the birthing huts.

Results:

Even though TBAs consider referring clients to another facility (including a birthing hut which is managed by another TBA) a discredit to their own professional standing in the community, referrals from TBAs to birthing huts for prenatal care increased from 20 percent to 64 percent between January 1992 and March 1993 following the initiation of the health communication campaign.

- Referrals from TBAs for labor and delivery increased from 17 percent to 34 percent during the same period.
- Maternal mortality decreased from 508/100,000 to 225/100,000 live births between 1989 and 1993.
- Perinatal mortality decreased from 48/1000 to 36/1000 live births between July 1992 and July 1993.



Affecting Behavior

The outcome of pregnancy and childbirth is to a large extent determined by the health behaviors and practices of the pregnant woman as well as the interaction between a pregnant woman seeking services and the providers of prenatal, intrapartum, postpartum and emergency obstetrical care. Too often, though, the pregnant woman and the health care providers operate under different health care models that may be in conflict.

A woman's health-care seeking behavior during pregnancy is influenced by traditional beliefs and practices, the social structure of her community and economic and environmental realities. A health care provider is influenced by two models: the provider's own traditional community values and the biomedical model promoted by modern medicine. Often a provider's personal environment—class, culture, religion—is similar to the client's but the professional environment is not. Providers' level of education and professional identity may in fact prejudice them against clients coming for services. A formal health service operates on standards, protocols and program incentives or disincentives and is shaped by medical hierarchies and infrastructural inadequacies. Social status issues and other forces may inhibit or motivate the provision of quality care. These realities must be brought into harmony in order for an intervention to be effective.

Social marketing is a strategy that attempts to link behavior change to an intervention. Based on the idea that an understanding of local attitudes, beliefs and practices will lead to more appropriate interventions, social marketing promotes messages directed at behavior change that is culturally acceptable. Research into the knowledge, perceptions, attitudes and practices of women and their health care providers provides a basis for designing messages and interventions based on women's own needs and desires. Social marketing directs messages not only to women, but also to the health care providers, family members and community leaders who influence health-seeking behavior, recognizing that behavior change must occur at all levels. The underlying tenet is that the clients themselves must participate in designing interventions that also meet technical criteria for desired impact.

Social marketing also relies on the marketing principles of price, product, promotion and placement to bring about behavior change. These principles can be translated into familiar public health terms of availability and cost

(price), quality of care (product), health communications (promotion), and access of products/services (placement). Formative research, program development and implementation carried out by MotherCare have revealed several universal lessons regarding the attitudes and practices which influence the seeking and provision of maternal and neonatal health and nutrition care:

Lesson: Pregnancy is considered neither a disability nor a time for special care.

Women commonly tend to use services to verify a pregnancy, possibly to check fetal growth or position, and during emergencies. Regular attendance at prenatal services is not yet widespread.

Message: Prenatal care is important because it can help to identify problems before they become severe. Likewise, use of services during delivery can prevent complications from becoming fatal. Women attending prenatal care regularly can be counseled to recognize danger signs. Prenatal care providers can link women with appropriate medical support if danger signs do appear. One of the most important messages directed towards women is the need to attend prenatal care routinely even when feeling healthy.

Lesson: Emergency care is sought only when signs of pending danger or actual complications are recognized and then only if they are considered serious enough.

Edema, for instance, is considered a "normal" experience by many pregnant women; swollen hands and face (a danger sign) may be treated with the same ambivalence as swollen ankles and legs.

Message: Messages directed to all pregnant women—both those who attend prenatal care and those who do not—should heighten ability for self-recognition of danger signs and emphasize the need for prenatal care. Danger signs and complications are not known by their medical terms and must be described precisely using health education language rather than abstract medical terms. The importance of taking the initiative to seek care in a timely manner must be stressed.

Lesson: Key client behaviors that can determine the outcome of a complication and influence maternal mortality and morbidity are:

- recognition of danger signs during pregnancy and complications during delivery;
- making timely decisions to seek help; and
- knowing how to get help immediately.

Message: The focus of health communication must be on supporters of the woman in addition to the woman herself since these are most often the people who will need to recognize a complication and make decisions in the middle of an emergency. Women and their supporters must know that it is time to seek help when any of the following occurs:

- fever and other signs of infection, such as severe headache or vomiting;
- failure to gain weight;
- extreme pallor;
- edema (especially in face or limbs);
- vaginal bleeding;
- labor longer than 12 hours;
- prolapse of cord or limb;
- malpresentation;
- convulsions.

Lesson: Key provider behaviors that influence maternal and perinatal morbidity and mortality are:

- recognizing danger signs during pregnancy and complications during delivery and the postpartum period;
- providing timely and quality care;
- making prompt decisions to refer.

Message: Health communication messages must target health personnel as well as pregnant women and their families. Changes in behavior within the health care system should be stimulated by and responsive to the needs of the client and the community. Changing the behavior of clients toward the use of services is usually dependent to some extent on the provision of less intimidating and more culturally appropriate services. This requires behavior change by the provider and begins with an attitude of respect for the client.

What Pregnant Women Can Do for Themselves: Health Promoting Behaviors and Practices

In the prenatal period, pregnant women are recommended to:

Increase the quantity and quality of their intake of nutritious foods.

Reduce their work load and rest more often.

Consume iron-folate tablets daily to prevent anemia.

Recognize danger signs of pregnancy and follow instructions for referral.

Community groups should consider emergency funds, blood donations and a transportation system for complicated deliveries.

In the intrapartum period, pregnant women who deliver at home are recommended to:

Ensure cleaner and safer delivery by requesting a trained TBA (if there is one) and using a "safe birth kit" (i.e., razor blade, soap, towel, sheets, string, matches).

Consume as much water as they want during labor and urinate frequently.

Recognize and seek help for complications, especially retained placenta, obstructed or prolonged labor, excessive bleeding and malpresentation.

Immediately put the newborn to the breast and begin exclusive breastfeeding.

Care properly for the cord and ensure care and warmth of the newborn.

In the postpartum period, all new mothers are recommended to:

Increase the quantity and quality of their intake of nutritious foods.

Reduce their work load and rest more often.

Recognize that excessive bleeding or prolonged fevers (2 days or more beginning after the first 24 hours post-birth) require immediate attention from clinical personnel.

Breastfeed the newborn exclusively for four to six months, beginning within the first hour of life.

Consume iron-folate tablets daily.

Seek family planning counseling. If fully or nearly fully breastfeeding, use of family planning may be delayed until any of the following occur: mother begins supplementing infant's diet regularly; menses return; or six months postpartum, whichever comes first.

Contraceptives used by breastfeeding women should be low in estrogen or nonhormonal. If not fully breastfeeding then begin a family planning method at six weeks postpartum.

Ensure the newborn is well nourished by exclusive breastfeeding, warm and clean to prevent such problems as acute respiratory infections and diarrhea

INQUISIVI, BOLIVIA:
"AUTODIAGNOSIS" FOR HEALTH PROBLEM IDENTIFICATION

Save the Children/Bolivia began MotherCare-assisted activities in fifty communities of the remote, rural Inquisivi Province in July 1990. Births are typically attended by the spouse; there are no traditional birth attendants and few health facilities available.

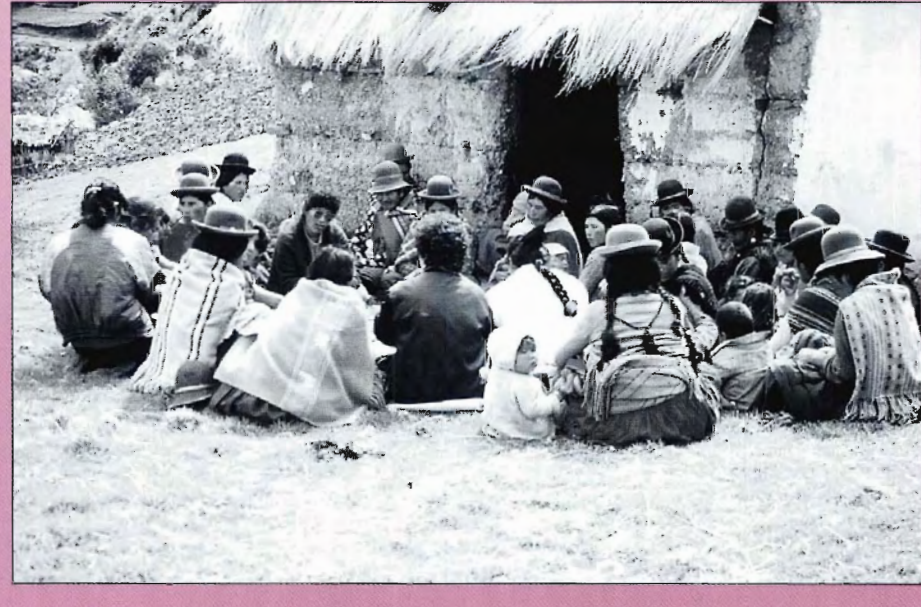
The "autodiagnosis" is a participatory research process in which women's groups are organized in selected communities and hold discussions to explore their maternal and neonatal health problems. A major goal of the process is to foster the women's confidence to speak up about health problems, to explore the commonality of the issues through discussions and interviews with other women and to learn to prioritize the problems that are identified.

Examples of the actions taken by women's groups as a direct result of the autodiagnosis include:

- Provision of family planning services through a local NGO;
- Training of 42 community women as *parteras* at a private hospital in La Paz;
- Income-generating projects to provide emergency funds for obstetric complications including the production and sale of safe birth kits;
- Credit and literacy training programs;
- Training of hundreds of community members—men and women—in various aspects of maternal and neonatal health and family planning;
- The development of booklets by and for women on pregnancy, birth, postpartum care and care of the newborn.

Results:

- Preliminary data show a decrease in the perinatal/neonatal mortality rate from 117 perinatal/neonatal deaths per 1000 births to 44 per 1000; 11 maternal deaths (1988-90) were reduced to 7 (1991-1993).
- Family planning acceptors of modern methods increased from 0.1% to 27% of women of reproductive age between 1992 and 1993 in communities where services were offered (in one community surpassing 60% of women of reproductive age).
- Increased use of *parteras*.



What Health Care Providers Can Do to Promote Safe Motherhood: Objectives and Audiences for Affecting Behaviors

Interaction With Household/Community—

(Pregnant women, their husbands or partners, their mothers or mothers-in-law and/or elder sisters, their political, traditional and religious leaders):

Prepare community to react quickly to reduce delays in seeking care;

Increase provision of, demand for and utilization of products and services;

Strengthen counseling skills of service providers and midwives;

Strengthen appreciation by health care system of beneficial or non-harmful practices of the community;

Improve formal health linkages and outreach with communities and traditional health networks (e.g., placement of obstetrical emergency personnel, equipment and supplies in primary health care settings)

Within the Health Care System—

(TBAs and traditional healers, community-based health care providers, clinic-based health care providers (e.g., midwives and nurses), Ob/Gyn physicians, Medical administrative officers):

Motivate use of safer birthing techniques and materials;

Recognize and comply with timely referral of pregnant women with danger signs, complications during delivery and danger signs in newborns;

Decrease harmful practices;

Strengthen follow-up counseling for postpartum complications;

Strengthen management and supervision, case management and infrastructure of services to comply with needs of clients.

Enhancing Policy Formulation

Policy formulation begins with advocacy, such as a "call to action" for the implementation of problem-oriented interventions, and moves to policy dialogue and information exchange to explore specific programmatic issues. Given no barriers, actual policy could be achieved with a government endorsement and with resource allocations to support implementation. Prior to the point of reform, however, a considerable amount of time is usually required to overcome barriers, clarify and state objectives and identify and rally constituents. The road to policy reform or formulation is often long and tedious, with some reforms taking years to enact, particularly when strategy refocus or reallocation of resources is involved.

Once policy reform has occurred, assessing its influence on bringing about the desired outcome(s) is essential. In some cases, movement stops after policy is in place because inadequate attention is given to the implementation plan and the allocation of technical and financial resources or because objectives are poorly articulated, understood and accepted. Often, more than one policy is required to achieve the desired outcome. When striving to improve maternal and neonatal health by strengthening the quality of maternal services, it is beneficial to put forward interrelated policies within the same time frame.

MotherCare's long-term demonstration and PVO projects have systematically approached the process of policy reform and/or formulation within this conceptual framework. In all the long-term demonstration project countries efforts have been made to promote endorsement of the delegation of authority in the provision of maternal services. This has involved upgrading of skills for the front line provider and tightening the referral and supervisory networks. The ability of the MotherCare long-term demonstration projects to move from advocacy towards policy reform in a relatively short period of time can be attributed to several essential factors:

- The majority of the countries have a functioning health infrastructure—public and private services, trained providers of various levels and potential for a communica-

tions network. While it is possible to move towards policy reform in settings with little public service infrastructure, it requires considerable time for an adequate policy dialogue to occur with local private groups coalescing to spearhead the movement. Also, models must be developed with an eye towards country resource capability. Ultimately, governments with sparse health services infrastructure will require additional resources and assistance to upgrade their health infrastructure and train and assign personnel.

MATERNAL HEALTH ISSUES THAT MAY REQUIRE POLICY FORMULATION OR REFORM

- Delegation of responsibility
- Regulatory framework for midwifery
- Coordination of services
- Referral systems
- Resource allocation
- Availability of reproductive health information
- Pregnancy termination
- Costs of treatment
- Economic tariffs on drugs and equipment

- There are political environments, such as a decentralized system for providing health services, which enable a more efficient process of policy formulation. This is the case in Nigeria where states are able to adopt their own initiatives and formulate their own policies. The decentralized model works well when adequate time has been given to policy dialogue, including an assessment of resources to support policy change.
- In most countries, MotherCare projects build on existing research, government priorities and constituents' interests. The international efforts advocating for Safe Motherhood have been a major stimulant.
- There is a role for donor agencies, PVOs and NGOs in assisting governments along the continuum from advocacy to policy reform and implementation. However, these groups must involve governments at the outset of the planning process so that designs are consistent with government priorities and capabilities and government takes ownership. Political will on the part of the government to move and sustain these projects is essential to policy reform and institutional development.
- Constituents are at the heart of the policy process. They must be identified early in the process. Endorsement must be sought of special interest groups who might function as barriers to policy reform. Continued advocacy efforts and dissemination of information to all constituents is essential.

Programming for the Health of Women and Newborns

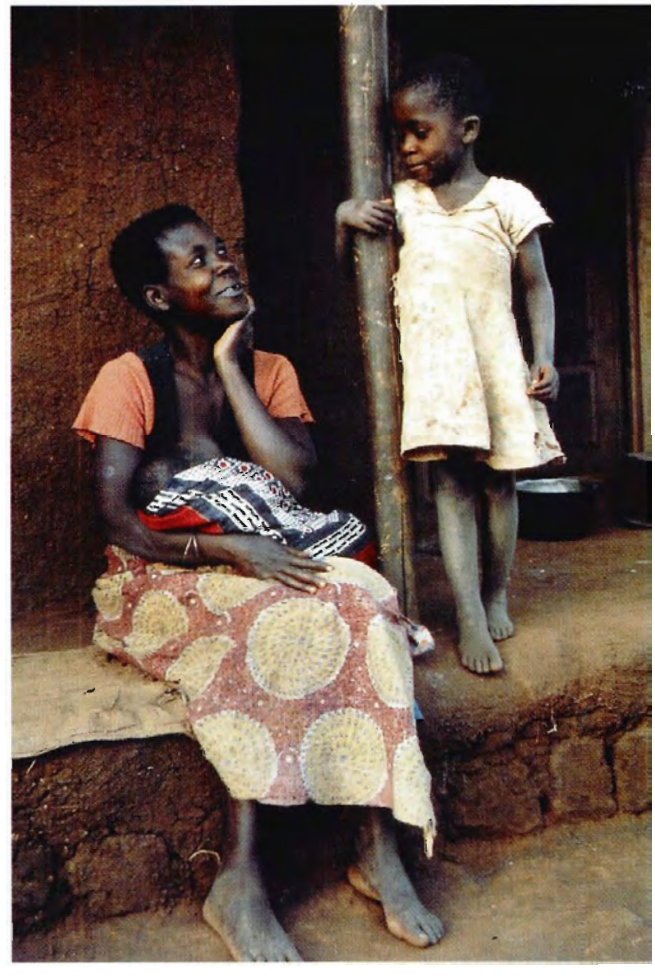
There is no simple recipe for improving maternal and neonatal health. A composite of specific technologies that can reduce maternal and neonatal mortality or prevent related morbidities is gaining wider recognition. However, the foundation for successful programming is not any particular technology but an attitudinal change assigning maternal and neonatal health and nutrition a high priority and the coordination of care that will address women's needs. Based on what is now known, after five years of MotherCare project activity, the following six recommendations are set forth as fundamentals of successful maternal and neonatal health and nutrition programming:

1 Put maternal and neonatal health and nutrition on the top of the agenda.

While policy makers may now seem to be familiar with the concept of Safe Motherhood programming, the gap between knowing and doing remains. Front line providers may still not have the linkages with communities or with referral sites necessary to ensure timely referral of women with complications; the supplies to provide even basic primary health care for women; or the motivation to do so. Getting maternal and neonatal health care and nutrition onto the action agenda of those who need the care and those who provide the care requires strong policies.

2 Know and cater to the woman's and her community's needs and constraints.

A multitude of traditions surround pregnancy and childbirth. Some customs and beliefs may be hazardous, such as the belief that obstructed labor is caused by adultery. In a community sharing this belief, a woman may fail to receive appropriate care if her condition is perceived to be punishment for her misconduct. Other traditions may be beneficial. The squatting position for childbirth preferred by many cultures is known to cause fewer tears than the supine position typically used in hospital settings. Many traditions could be adapted by health services with few difficulties and major payoffs. For example, in Cochabamba, Bolivia, women did not want hospital deliveries because they could not retrieve the placenta, the burial of which is thought to be crucial to ensuring a good start for the baby. Some hospitals in Cochabamba now provide the placenta to the families, thereby saving themselves the cost of disposal. Understanding the perceptions, needs and constraints of women and others in the community is a major first step in designing a program appropriate for and acceptable to those it addresses.



3 Know and address the service providers' needs and constraints.

Midwives are key to the maternity care team, yet in many places midwives have not received refresher training in years, are overwhelmed by other primary health care responsibilities or may not even exist as a profession. Making room in health workers' already busy schedules, or giving higher priority to midwifery, takes more than administrative orders or a change in job descriptions. Similarly, delegating authority to midwives to perform essential obstetric functions, such as manual removal of the placenta, requires more than a policy change. Protocols on managing complications, supplies and logistical systems to provide obstetrical first aid, upgraded skills, linkages with medical back-up to follow up

obstetrical referrals, supportive supervision, a means to follow up in the community—all are needed to rejuvenate maternal and neonatal health and nutrition services.

4 Move the services closer to the woman.

Getting well-trained midwives into the community has proved to be a successful strategy in numerous settings. Where a midwife goes to provide this prenatal and birth assistance may depend on the community's resources. In Tanjungsari, Indonesia, birthing huts with two-way radios and access to an ambulance were established in 10 villages; in Matlab, Bangladesh, the midwife was called by a messenger who traveled on foot; the midwife had access to a boat and boatman to transport her to the woman's home. In Nigeria, midwives are setting up community clinics for prenatal care. In Fortaleza, Brazil, the university established obstetrical units for trained TBAs with telephone connection to the hospital; midwives visited the units weekly to work with the TBAs. Several projects have demonstrated the effectiveness of outreach by midwives able to detect complications and provide obstetrical and neonatal first aid early. Although maternal mortality continues to be difficult to measure, the evidence supporting this outreach strategy is accumulating.

✦ Continuum of Care ✦

Components of Maternal/Neonatal Health Package at Each Level of Health Care System

Home and Community

- Family planning services/information
- Normal delivery
- Recognition of danger signs
- Iron-folate tablets
- Tetanus toxoid immunization
- Malaria prophylaxis
- Plan for referral transport
- Clean, safe labor and delivery (kit)
- Establishment of breathing
- Warming/drying/cord care/eye care
- Immediate breastfeeding

Health Center

- Family planning services/information
- Outreach/counseling
- Tetanus toxoid immunization
- Risk assessment
- Malaria case management
- Syphilis screening/treatment
- Manual procedures
- Oxytocin for bleeding
- Antibiotics for ruptured membranes
- Medication for hypertensive diseases of pregnancy
- Labor management via partograph
- Treatment of incomplete abortion
- Breastfeeding promotion
- Neonatal first aid

Referral Facility

- Surgical family planning
- High-risk case management
- Surgery
- Blood replacement
- Sepsis
- Prolonged/obstructed labor
- Pre-eclampsia/eclampsia
- Sick neonate care
- Unplanned pregnancy management

NAIROBI, KENYA:
PREVENTION OF CONGENITAL SYPHILIS

The estimated prevalence of syphilis in 1986 among women delivering at Pumwani Maternity Hospital in Nairobi, Kenya was 4%, believed to be a gross underestimate due to unreported abortions and premature births and fetal deaths delivered elsewhere. If pregnant women with syphilis remain untreated, one fourth of their pregnancies will end in miscarriage or stillbirth while another third will result in congenital infection. Prior to the project only 60 percent of clients at urban prenatal care clinics were screened for syphilis (University of Nairobi, 1989), and only 9 percent of those testing positive were treated.

The University of Nairobi and the University of Manitoba, under a grant from the Canadian government, have been working to strengthen sexually transmitted disease prevention and treatment activities in Nairobi City Council (NCC) public health clinics. The Nairobi City Council, Public Health Department is the major health provider in the city of Nairobi operating 54 of the 154 registered health units within the city. Technical assistance from MotherCare has enabled the integration of syphilis counseling, testing and treatment into 10 of the 19 NCC clinics offering prenatal care.

MotherCare supported staff training in clinical, counseling and supervisory skills and the use of IEC materials that were developed based on formative research conducted by MotherCare in the clinics and the community. MotherCare also supplied diagnostic equipment and drugs to the clinics to enable them to perform on-the-spot syphilis screening for all women attending prenatal care using the Rapid Plasma Reagin (RPR) test. Positive cases are treated immediately. Partner tracking is also a part of this screening and treatment service.

Results:

Over the five-month period following implementation, results of the communication effort have been dramatic:

- 100 percent of new prenatal care attenders were screened for syphilis;
- 85 percent of those who tested positive were adequately treated;
- 52 percent of their partners (assuming one partner per seropositive pregnant woman) were treated;
- Training materials for screening, treatment and counseling skills for prenatal care providers at NCC clinics have been piloted and are now being finalized.

5 Move the woman closer to services.

Knowledge of the danger signs of pregnancy, labor and delivery and of the postpartum/neonatal period and where to go for appropriate services is essential to reducing maternal and neonatal mortality. In the interest of improving timely and appropriate use of services, these signs must not only be recognized by the woman, but also by those who are in a decision-making position during the times when she may be disabled and who are responsible for getting her to the appropriate facility. Mobilizing the resources to transport the woman or newborn to services without delay once complications are identified may require a community-wide effort.

6 Provide a comprehensive package of services to the woman and her newborn.

What is needed to ensure good maternal and neonatal health and nutrition? A feasible package of services begins in the community, where most deliveries continue to take place. Essential to delivering this package are the targeting of communication strategies to increase awareness of danger signs and complications to multiple audiences (women, families, providers); extending outreach services for obstetrical and neonatal first aid into the community; and strengthening mechanisms for transporting women and newborns from the home/community to referral centers where providers can competently manage the problems at hand. Services at the health center level should be woman-focused, ensure that her privacy and dignity are respected and provide her with care to match her needs during and beyond pregnancy—gynecological, obstetrical, other health and nutritional.

Hospitals are frightening places that must become more woman-friendly, not only in the attitude of staff and their supervisors, but in their competence to manage the medical problems with which women present. Tying these various levels of care together is policy that values women's lives—and acts on this belief by permitting the trained provider at the most peripheral level to assist women in need.

Programming for improving maternal and neonatal health care requires a sequencing of components. The process begins with **formative research** to understand the health behaviors of the woman and her family and the front line providers, especially those who provide prenatal care and those called upon to assist during labor and delivery. Such research provides the basis for a **communications strategy** aimed at putting maternal and neonatal health on the agenda of communities, providers and policy makers. It provides the basis for a program of **training and coordination** of the health services staff at the primary health care level as well as at the referral hospital. But the training of staff and the improvement of coordination between the different levels of the health infrastructure alone cannot guarantee quality care; **equipment, supplies, drugs, logistics systems, supportive supervision, monitoring and evaluation means, backed up by enlightened policy guidelines,** are also indispensable elements of a comprehensive maternal and neonatal health care system. MotherCare has developed many tools to assist with the process of developing maternal and neonatal care programs (available from MotherCare). But it cannot be overemphasized that in order for programs to be acceptable to women and their families, not only must the customs that so enrich the event of childbirth be respected, but the cost of services must be within their means and the competence of providers to manage obstetrical and neonatal complications must be incontrovertible.

Selected Maternal Health Publications Available from MotherCare

American College of Nurse Midwives. *Life-Saving Skills Manual for Midwives.*

A 10-module manual for midwives and midwifery students on how to identify, treat or stabilize and transfer women with obstetrical emergencies or potential obstetrical emergencies. Manual uses problem-solving method to train both trainers and participants to provide quality advanced midwifery skills to women and newborns in conditions of risk of death.

MotherCare/Family Health Services Project, Nigeria/Johns Hopkins University PCS. *Interpersonal Communication and Counseling Curriculum for Midwives.*

A six-session curriculum designed to train midwives in effective interpersonal communication and counseling in order to promote a relationship of trust and confidence with the client. These skills are essential to helping clients make informed choices about their maternal health and to enabling the midwife to understand the woman's perspective concerning her health and nutrition as well as her knowledge and concerns.

MotherCare-INCAP/PAHO-Quetzaltenango Health Area. Quetzaltenango Maternal and Neonatal Health Project. *Training Manual for Trainers of Traditional Birth Attendants.*

A six-module training-of-trainers manual for training traditional birth attendants to take appropriate action to save the mother's and/or the baby's life when threatened by obstetrical or perinatal emergencies. Designed to help the educator use participatory training methods and inexpensive, easily constructed materials.

INCAP/PAHO-Quetzaltenango Health Area. *Management of Obstetric and Neonatal Emergencies in Community Health Centers.*

Protocols for the management of those obstetric and neonatal complications that produce the most deaths among mothers and newborns in the rural Guatemalan highlands (hemorrhage, sepsis, preeclampsia/eclampsia; asphyxia due to prolonged labor and malpresentation, sepsis, complications due to prematurity and low birth weight). Prepared for use by community health services, the protocols cover, by complication: definition of the complication; signs and symptoms; history taking; physical exam; referral criteria and case management.

MotherCare-INCAP/PAHO-Hospital General de Occidente San Juan de Dios. *Obstetric Management Protocols for Regional – Departmental Hospitals.*

Protocols for the treatment of maternal and neonatal patients in the outpatient clinics, labor and delivery ward and postpartum service of the Department of Obstetrics of the Hospital General de Occidente San Juan de Dios, Quetzaltenango, Guatemala. The protocols are intended for use by attending obstetricians, graduate and auxiliary nurses, medical residents and medical students.

MotherCare. *Management of Life Threatening Obstetrical Emergencies.* Protocols and Flow Diagrams for Use by Registered/Licensed Nurse-Midwives or Midwives in Health Centers and Private or Government Services.

Designed to enable midwives to give prompt emergency treatment for life- threatening conditions in order to reduce maternal and perinatal mortality. The protocols also enable health and maternity centers to establish standards of practice for the management of eight potentially life-threatening obstetrical conditions.

MotherCare-Save the Children/Bolivia. *The Warmi Project: A Participatory Approach to Improve Maternal and Neonatal Health—An Implementor's Manual.*

Intended to be used as an implementation manual by private voluntary organizations (PVOs) and nongovernmental organizations (NGOs) who want to adopt a participatory approach to improving maternal and neonatal health. The manual is based on the "Warmi" (woman) project implemented in rural Bolivia in a remote setting where there is little access to adequate formal health services and provides a simple model for community-level problem solving.

MotherCare/The Manoff Group/USAID. *Guide for Country Assessment of Breastfeeding Practices and Promotion.*

Assessment guide designed to be used in-country by a carefully selected team of two to three people with clinical and program expertise related to breastfeeding. Based on the assessment, a program can be developed with the specific objective of increasing the number of mothers who exclusively breastfeed their children from birth through six months of age, and who continue to breastfeed after they introduce complimentary "weaning" foods at four to six months.

MotherCare/The Manoff Group. *Applying Social Marketing to Maternal Health Projects: The MotherCare Experience.*

Designed for social marketing, health communication and information, education and communication (IEC) specialists, maternal health program managers and researchers. The guide is intended to convey the process, products and lessons learned from designing and implementing social marketing activities and their health communication components under MotherCare. Issues include warning signs of obstetrical complications, appropriate use of services, beliefs and practices during pregnancy.

A complete list of publications is available from MotherCare.

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STDs AND WOMEN'S HEALTH

Introduction

Sexually transmitted diseases (STDs) are the most prevalent group of infectious diseases, affecting sexually active 15-44 year olds and infants born to infected mothers. According to the World Health Organization (WHO), in excess of 250 million new cases of STDs occur each year. Up to 40 different microbial agents can be transmitted sexually, although only a minority have sexual transmission as their sole or dominant route of spread. Effective prevention and control of STDs is essential to slow the growing incidence of acute infection, complications and their sequelae, their role in facilitating the transmission of human immunodeficiency virus (HIV) and their economic impact. Though STD rates are comparable in both men and women, the major burden of complications and sequelae fall on women and their infants.

The consequences of STDs are now well known. Women with untreated STDs can suffer complications such as pelvic inflammatory disease (PID) which can then lead to ectopic pregnancy or infertility. STDs in pregnant women can result in prematurity, stillbirth, spontaneous abortion, chorioamnionitis, premature rupture of membranes, pre-term delivery and post-partum endometritis. Complications to neonates include gonococcal and chlamydia conjunctivitis, leading to blindness; pneumonia caused by either chlamydia or herpes simplex virus which can lead to chronic respiratory disease or death; and untreated syphilis in the infant, which can result in congenital infection causing permanent disability. In this issue of *MotherCare Matters,* we examine the magnitude of the problem and possible programmatic responses. Section One presents an overview of the problem, focusing on gonorrhea and chlamydia, two highly prevalent conditions which often remain undiagnosed, and on STDs in adolescents, a hard to reach population with high incidence of many STDs. Section Two reviews existing programs and examines current issues in providing STD prevention and control services.

Attention to STDs has increased dramatically in the last decade since the outbreak of the AIDS pandemic. Yet in spite of this heightened awareness and programmatic emphasis, many girls and women in resource poor settings continue to be at great risk for acquiring STDs and suffering from their complications because they lack access to maternity care and family planning services or receive inadequate care from untrained providers working in poorly equipped settings. In addition, women can be hard to reach, only entering the health care arena during pregnancy or as caretaker and advocate for their sick children. Existing programs often are not designed to reach women, and those that are, such as antenatal care, often are not equipped to address STDs and their

associated problems. In an article on diagnostic algorithms, this issue addresses the problems associated with diagnosing STDs in resource poor settings, and gives hope for STD programs in areas where labs and diagnostic equipment are not available. In addition, integration of programs may help to concentrate resources, as a second program-oriented article points out. Still, integration remains an option that is only infrequently tried, and few successful models exist on which to base programs. This article outlines the issues involved in this process, and discusses some of the frequently cited obstacles to successful integration of programs.

Together, these articles illustrate the broad range of topics involved in STDs and maternal health, from the important role that STDs play in women's health throughout the life cycle to the issues involved in developing successful program models. Most important are efforts to reduce the impact of STDs through prevention and to bring women more often into contact with better services. As MotherCare II begins its next five year initiative to reduce maternal and perinatal mortality and morbidity and improve women's health overall, STD prevention and control with all its components will be a major consideration in program design and implementation.

Bill Brady, STD Advisor, MotherCare

SECTION ONE

STDs: THEIR MAGNITUDE AND CONSEQUENCES

Gonorrhea and Chlamydia—Their Cost to the Health of Women

By Joann Schulte, DO,
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Women in developing countries face a higher risk of acquiring a sexually transmitted disease (STD), including human immunodeficiency virus (HIV), than their counterparts in developed countries.

This pattern has emerged for several reasons. STDs are considerably more common in developing countries, and seeking STD treatment is among the five top reasons for seeing a doctor (Arya et al., 1977; Osoba, 1981). Gonorrhea rates are 10-15 times higher in pregnant women in developing countries than in their counterparts in industrialized nations. The reported rates of chlamydia are two to three times higher, but may be under-reported (Khoo et al., 1977; Perine et al., 1980; Germain, 1989; Wasserheit, 1989).

Another important factor is the relationship between HIV infection and other STDs. HIV is most often acquired through heterosexual intercourse in developing countries, a pattern that differs from that in Europe and the United States. Co-infection with HIV and other STDs is common, and this in turn can facilitate further transmission of STDs. Also, transmission of an STD from an infected man to a woman is more efficient than transmission from an infected woman to a man. During one act of vaginal intercourse, an infected man will transmit gonorrhea to an uninfected female partner 60-90% of the time (Hooper et al., 1978). A woman with a gonococcal infection is estimated to infect her male partner 20-40% of the time during one act of sexual intercourse (Hooper et al., 1978).

Also, women are most likely to be affected by long term complications of STDs including such serious complications as pelvic inflammatory disease (PID), infertility, and ectopic pregnancy. Women infected with an STD often have asymptomatic infections. Pregnant women who acquire an STD may experience prema-

ture labor and postnatal infection; the infants of such women may be stillborn, develop congenital malformations or neonatal infections (sepsis, pneumonia or neonatal conjunctivitis), or suffer neurological damage, including mental retardation.

Gonorrhea and Chlamydia

Gonorrhea and chlamydia are two conditions that provide excellent examples of how STDs can adversely affect women's reproductive health. A woman's genital tract contains columnar epithelium, a type of cell to which *Neisseria gonorrhea* easily attaches. Upper genital tract infections may develop because the gonococcus can travel upward along with sperm. Infection with gonorrhea causes a cervical discharge only 10-20% of the time. Up to 70% of women may have indications of gonococcal infections if nonspecific symptoms, such as lower abdominal pain, vaginal discharge and painful intercourse, are considered.

Because many gonococcal infections are asymptomatic, women may go untreated unless screening programs are undertaken. Another problem develops when a woman's sex partner is infected and treated, but the woman is not. In general, screening is suggested for women who are less than 25 years of age, do not use barrier protection (such as condoms or diaphragms), are pregnant or have multiple sexual partners. Treatment should not be considered complete until their partners have also been treated.

In developing countries, treatment of gonorrhea is a major problem because effective antibiotics are expensive and antibiotic resistant strains of gonorrhea are quite common. Antibiotic resistant gonorrhea can develop through chromosomal resistance or acquisition of plasmids, a jumping genetic element that transfers antibiotic resistance among a variety of microbial organisms. Antibiotic resistance first became common in Southeast Asia and Africa about 20 years ago. Now up to 80% of gonococcal strains in some African countries are resistant compared to the 8% reported from the United States in recent years.

The Centers for Disease Control and Prevention (CDC) currently recommends ceftriaxone, cefixime, ciprofloxacin, and ofloxacin for treatment of uncomplicated cervical gonorrhea. Specific treatment recommendations are contained in the 1993 STD Treatment Guidelines, published by the CDC as a supplement to *Morbidity and Mortality Weekly Report*. Co-treatment with doxycycline is recommended because many persons with gonorrhea are co-infected with chlamydia.

Chlamydia trachomatis infection is estimated to be the most common STD in the United States, with 4 million new infections annually. Nevertheless it is considered to be under-reported in most developing countries. Chlamydia prevalences of 4-20% have been reported in studies done among pregnant women in Africa during the last decade (CDC, 1993). In the United States, 42 states require chlamydia reporting. Case numbers have risen with the availability of reliable, inexpensive screening tests. However, such testing is too expensive for many developing nations. Many nations that cannot afford specific chlamydia diagnostic tests instead diagnose mucopurulent cervicitis (MPC) and treat presumptively for chlamydia infection. MPC is diagnosed by demonstrating yellow or green mucopus in endocervical secretions; 10 or more polymorphonuclear leukocytes (PMNs) in a Gram stain of endocervical contents; or friability (bleeding), erythema or edema of the cervix during a pelvic exam.

Chlamydia infections share many similarities with those caused by gonorrhea. *C. trachomatis* may infect the cervix, uterus and upper genital tract, but may also cause a urethritis. Up to 30% of women with chlamydia infections may have no symptoms, and, as with gonorrhea, screening programs are important if women are to be found and treated. The CDC-recommended therapy for uncomplicated chlamydia is either doxycycline or azithromycin.

Infertility and Ectopic Pregnancy

Both gonorrhea and chlamydia extract a high price from women through ectopic pregnancy and the complications of infertility related to PID. Both STDs cause tubal scarring as acute infections heal. That scarring reduces the normal diameter of the Fallopian tubes or blocks

the tubes and also alters the normal motion of cilia that sweep the ova down to the uterus. Several treatment regimens have been developed by CDC for outpatient and inpatient uses, which vary with each patient's circumstances.

Infertility is usually defined as a woman's inability to become pregnant within 12 months of trying to conceive while using no contraception. In developed countries, the incidence of PID-caused infertility is estimated at 15%-25% of all gonorrhea and chlamydia cases, increasing to 70% after three episodes. The percentages are thought to be higher in developing countries because PID treatment is usually very delayed, of insufficient duration or completely unavailable. In some sub-Saharan African countries up to 33% of all women are infertile. A well-documented band of infertility extends from Gabon in the west to Sudan in the east (Belsey, 1976; Rosenberg et al., 1986).

Ectopic pregnancy results when an embryo is unable to complete the passage to the uterus and embeds in the Fallopian tubes or in an extra-uterine environment. In the United States, the ratio of ectopic pregnancies to normal deliveries increased from 1:208 in 1970 to 1:43 in 1987 (CDC, 1987). In some developing countries, that ratio is even higher. Gabon has reported a ratio of 1:62 (Picaud et al., 1989), and Nigeria a ratio of 1:43 (Olatunbosun 1986). Even so, ectopic pregnancies are considered under-reported because pregnancy, abortion and delivery services are poorly developed and under-utilized. Ectopic pregnancies are often a medical emergency because the developing fetus can cause serious bleeding and other complications, mandating immediate, life-saving surgery.

Maternal infections with gonorrhea have been linked to premature birth with rates from 12-51% reported. The association between chlamydia infection and premature birth has not been as consistent. Both gonococcal and chlamydia infections in pregnant women cause neonatal conjunctivitis, and chlamydia may also cause pneumonia.

Increased recognition of how STDs can drastically alter a woman's life in any country is a matter of public health importance, but is especially important in countries with high prevalence rates. Some researchers have estimated the problems of STD-associated morbidity and mortality to be as serious as those caused by vaccine-preventable diseases and as worthy of intervention.

Improved funding is needed to address this problem as is increased awareness by women of spermicides and barrier methods, such as sponges and diaphragms, that they can use and control. Also, recent studies have documented the importance of spermicides and barrier methods in preventing transmission of STDs (Weir et al., 1994; Zekeng et al., 1993; Feldblum et al., 1994). Women using the sponge or diaphragm had at minimum a 65% decrease in gonococcal infections compared to women not using barrier methods. Studies have also documented that nonoxynol-9, a spermicide, reduces gonococcal infection among women who use it regularly. Although controversy currently surrounds the use of nonoxynol-9 (see Box 1 of this issue), it remains the most widely available effective spermicide. More women in developing countries must be educated on how to use such barrier devices to control their fertility as desired and protect their health.

Commentary

Shulte's article highlights the impact of sexually transmitted diseases (STDs) on women's health with respect to quality of life. Although transmission patterns of various STDs are distributed equally between men and women, women clearly suffer more as a result of severe complications of undetected and untreated reproductive tract infections. Two of the most prevalent and often asymptomatic conditions, gonorrhea and chlamydia, contribute heavily to the disease burden.

This article discusses women's vulnerability, not only biologically, but also socially and economically. In many societies, the status of women remains low with respect to men, thus limiting women's access to health services, information and the authority to make decisions. In this environment of limited education and resources, women have an enhanced vulnerability to disease and illness, including STDs.

Schulte suggests that prevention remains the optimal solution, making essential the education of women in the use of barrier methods such as condoms, sponges and the diaphragm, and other risk reduction skills. Providing education about barrier methods of protection to women in resource poor settings must include outreach efforts to women with limited access to health services and to those who might not consider themselves at risk for STDs. Also, use of many methods of prevention is dependent on the knowledge and cooperation of a woman's husband or partner, which can be highly problematic. In most countries, open communication about sexual matters and negotiating the use of protection with the male partner is difficult and can be an obstacle to prevention. Consequently, in many situations women who suggest such steps may suffer reprisals. One partial solution is to place more control with women by developing and promoting female-controlled technologies such as microbicides (Heise and Elias, 1993). Some controversy over microbicides does exist, and this is discussed further in the article below.

Microbicides—On the Horizon as a Benefit for Women

By Bethany Young, MPH

Generally, condoms are promoted as the most effective means of preventing STD transmission including HIV, the virus that causes AIDS. The use of vaginal microbicides is a less known but effective method of prevention. While the search for new vaccines has dominated the prevention research agenda for many years, microbicide technology recently has emerged as a promising new technology.

A number of existing chemical entities have been shown to kill STDs and HIV *in vitro* and are possible candidates as microbicides. These include: nonoxynol-9, sodium oxychlorosene, chlorohexidine, porodine iodine, benzalkonium chloride and gramicidin.

Nonoxynol-9 (N-9), a non-ionic detergent, is the most widely accepted of these agents in the United States. Recently, controversy has arisen surrounding its widespread use. Some studies suggest that N-9 has a protective effect against cervical gonorrhea and chlamydia, and it has been demonstrated to kill HIV instantaneously *in vitro* (Roddy et al., 1993; Weir et al., 1994; Rosenberg et al., 1987).

Conversely, other studies contend that N-9 may actually facilitate HIV transmission when used frequently or in high concentrations by disrupting the superficial layers of the vaginal mucosa. This in turn leads to irritation and ulceration, ideal sites for entry of HIV pathogens. For instance, a study in Kenya that looked at Commercial Sex Workers (CSWs) found that women who used a sponge containing one gram of N-9 several times a day had a higher incidence of HIV than women in the comparison group who did not use an N-9 treated barrier method (Kreiss et al., 1992).

Given the uncertainty of N-9 as a safe vaginal microbicide, preliminary research is now underway to investigate the potential of other chemicals. Researchers claim that Gramicidin, a compound developed as a contraceptive by scientists in the former Soviet Union and used in a variety of topical ophthalmic antibiotics including Neosporin, is 1000 times as effective as N-9 against HIV *in vitro* (Bourinbaiar et al., 1994).

Further research is needed to investigate potential vehicles for delivery of microbicides, a major issue in making the technology accessible to women. Potential vehicles include the contraceptive sponge, gels, suppositories, vaginal film and foams. Studies are underway to pursue leads in this very much needed area aimed at empowering women to control their fertility and at the same time protect themselves from sexually transmitted infections including HIV.

Furthermore, this article makes a strong argument for improved STD control strategies during the antenatal period and other entry points for pregnant women both within both the formal and informal health care systems. Clearly, there are great advantages to providing services during the prenatal period to reduce adverse effects both on the mother and the neonate. Such efforts depend on successfully integrating antenatal and STD services. Integration of services is a complex issue, as the article on integration of services in this issue describes. In particular, STD services often carry a stigma and therefore can serve as a disincentive to seeking care.

Successful prevention efforts are dependent on taking into consideration women's needs and constraints when establishing programs. Changes in women's status that empower women to take control of protecting their own health are the real, long term need. In the short term, providing the knowledge and resources for women to do this for themselves within the parameters of their lives can be a first step in this process.

"It Won't Happen to Me"—STDs and Adolescents

by Marjorie Macieira,
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Abstracted by Chad Nettesheim,
Intern, Advocates for Youth

The incidence of sexually transmitted diseases (STDs) among adolescents worldwide has increased markedly in the last 20 years. Gonorrhea, chlamydia, syphilis, herpes, genital warts, and HIV are the most prevalent STDs among teens. The World Health Organization (WHO) reports that worldwide, one in 20 teenagers contracts an STD each year. WHO also reports that one-fifth of people worldwide with AIDS are in their twenties. Taking the long latency period into consideration, it is probable that they contracted HIV during adolescence.

Regional statistics confirm the high incidence of STDs among youth:

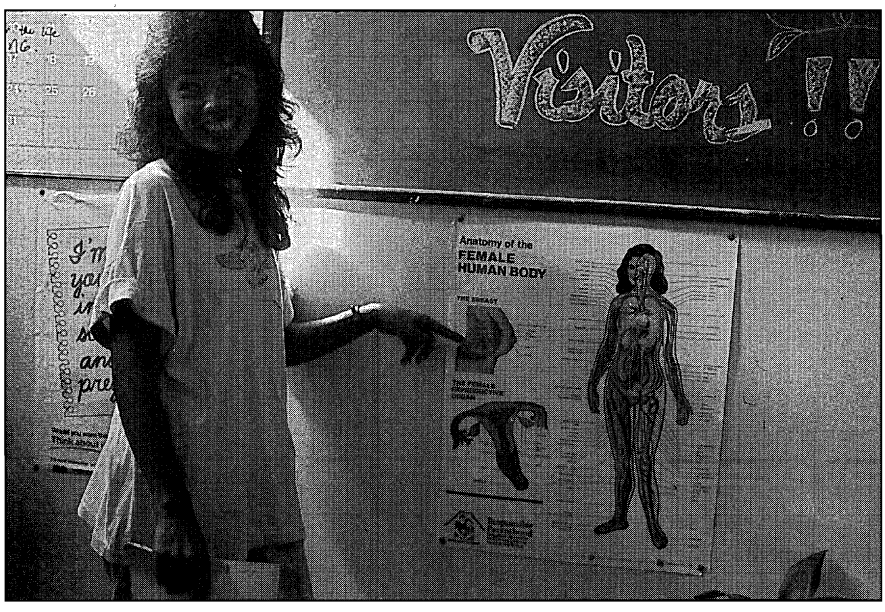
- ✦ In Yurimanuas, Peru, 92 percent of surveyed high-school boys have had sexual intercourse. Twenty-three percent of these young men have been infected with an STD, according to a study conducted in 1989. Of the 54 percent of girls who had experienced sexual intercourse, 16 percent have had an STD.
- ✦ At a family planning clinic in New Zealand, forty percent of the women with chlamydia infections were younger than 20 years of age.
- ✦ Every year 2.5 million U.S. teenagers are infected with an STD; this number represents approximately one of every six sexually active teens and one-fifth of the national STD cases.

In spite of these frightening statistics, there are a number of obstacles that prevent the control of these diseases among adolescents. Among these are denial on the part of teens that they can contract STDs, contributing to the continued practice of high risk behavior, and the fear of adult recrimination that frequently prevents teens from asking questions or seeking help. In addition, other obstacles common to all age groups may affect teens even more acutely, such as the fact that some STDs are asymptomatic and the fact that they do not know how to recognize symptoms even when they are present.

Why are young people especially vulnerable to STDs?

Certain cultural practices can contribute to the high incidence of STDs, including HIV, among adolescents.

- ✦ In Latin American countries like Guatemala and Ecuador, some young men are at greater risk for HIV and other STDs because they often have their first intercourse with a prostitute.



- ✦ The practice of female circumcision in parts of Africa may contribute to a higher risk of HIV infection among young women. Many health experts believe that the formation of scar tissue, which is more likely to bleed during intercourse, can facilitate HIV transmission, as well as the re-opening of circumcision wounds to permit intercourse.
- ✦ Young women in parts of Africa are also at high risk of STD infection from "sugar daddies"— older men who often believe that having sexual relations with a young or virgin girl will cure an STD.

Young women are particularly susceptible to STDs because:

- ✦ They are generally less informed than boys about STDs and how to prevent them.
- ✦ Young men have more access to reproductive health information through discussion with older boys or other contacts outside the immediate family.
- ✦ Their developing cervical anatomy makes them more vulnerable to STDs than their partners.

In addition to the physical complications arising from STDs, young women may suffer emotional consequences. STDs have an additional element of humiliation for young women as they are considered unclean, whereas for young men they can signify sexual potency. The taboos and silence surrounding issues related to women's sexuality and health in many cultures further compromise young women's health by making it difficult for them to seek care or even to discuss their problems.

What are the obstacles to educating teens about STDs?

When educating adolescents about STDs, health workers must overcome the perceived adolescent belief that they are invulnerable, the "it-won't-happen-to-me" syndrome. This attitude is reflected in continued risk-taking behavior, especially among adolescents who are well-informed about how HIV is transmitted.

One denial strategy is to believe falsely that HIV/AIDS is only prevalent among groups with whom the young person may not identify, such as homosexuals, drug users and the sexually "promiscuous." Teens feel safe as long as they are among "well-known friends" and "nice" girls and boys. Additionally, while young people may have a number of partners through a series of relationships, they are generally monogamous within their relationships and so do not consider themselves to have multiple partners.

An added complication affecting the diagnosis, treatment and control of STDs among adolescents is that young people are hesitant to get tested for HIV or other STDs. They may fear that they will be asked about sexual practices and drug abuse, and be concerned that they may actually test positive for HIV. Adolescents also fear betrayal of privacy as well as discrimination.

Many youth who live and work on the streets often turn to sex for their livelihood or to replace intimacy and nurturing that is absent from their family relationships. Low self-esteem, hopelessness, and more pressing needs such as

finding food and shelter often cause them to ignore the seemingly more remote dangers of STDs, to shun condoms and to resist advice on safer sex.

What are the current approaches being used to educate teens?

Despite great challenges, such as resistance to condom use, lack of political endorsement and shortage of materials, a variety of programs worldwide are working to educate teenagers about the risks of STDs, including HIV. These interventions range from school-based education and community outreach to peer programs that target both in-school and out-of-school youth, including teens in high-risk situations.

The most successful interventions are those that rely on young people to educate their peers and programs involving people with AIDS (PWAs). Peer counselors produce the greatest attitude changes related to adolescents' perceptions of personal risk of HIV infection, as well as changes in behavior to help prevent transmission. They can also be powerful models of healthy behavior while the openness and intimacy found between young people themselves also facilitates this process. Two successful program models are outlined below:

- **Targeting males** – The Man Talk Project in Swaziland trains young men to distribute condoms among men in factories, bars, clubs and neighborhoods. In the Netherlands, special male clinics have been opened, along with an effort to enlist key male figures (such as sports trainers) as educators.
- **Hotlines** – Trinidad and Tobago and Puerto Rico, among other countries, offer confidential telephone support and information services staffed by volunteers. In the Philippines, the hotline service is accompanied by television spots that direct teens to "dial a friend."

Other effective approaches to STD prevention education include:

- **Non-traditional education** – Videos with "survival sex" tips for street kids in Brazil, drama groups in Malaysia, and soccer matches where condoms are distributed in Guinea represent innovative approaches to educating youth separated from families and schools.
- **Condom availability programs** – Institutions such as the public schools of New York City and the government of Spain have recently opted to make condoms available free of charge to adolescents.

What is the key to making these strategies successful? Opinions differ, but one thing most agree on is a basic philosophy emphasizing an open and safe environment for discussion of adolescents' ideas and feelings, and respect for their chosen patterns of behavior. In this way, the responsibility for young people's health is put into their own hands along with the tools to help them clarify their values and choose their own appropriate behavior.

SECTION TWO

PROGRAM CONSIDERATIONS

Clinical Algorithms for the Screening of Women for Gonococcal and Chlamydial Infection—Evaluation of Pregnant Women and Prostitutes in Zaire

Bea Vuylsteke, Marie Laga, Michel Alary, Marie-Madeleine Gerniers, Jean-Pierre Lebughe, Nzilambi Nzila, Frieda Behets, Eddy Van Dyck, and Peter Piot. ***Clinical Infectious Diseases. 1993; 17:82-8.***

From the Center on AIDS and STDs, Institute of Tropical Medicine, Antwerp, Belgium; and the "Project Sante pour Tous", Belgian-Zairian Development Cooperation, and Project SIDA, Ministry of Health, Kinshasa, Zaire.

Abstracted by Abigail Harrison, MotherCare

Neisseria gonorrhea and *Chlamydia trachomatis* are two frequent causes of genital infection that have a major impact on health, particularly that of women and neonates. These infections have been shown to facilitate the transmission of human immunodeficiency virus (HIV). Yet a substantial proportion of women with gonococcal and/or chlamydial infection are asymptomatic. This makes active case detection problematic, particularly in developing countries, where facilities and materials for laboratory testing are limited.

Objectives

The objectives of this study were to define variables that are predictive of gonococcal and chlamydial infections in women; to assess the diagnostic validity of selected flow charts based on the WHO-recommended clinical algorithms as a screening tool for gonococcal and chlamydial infections in high and low-risk populations in Africa; and to assess a "non-hierarchical" decision system as a tool for case finding in the same populations.

Methods

Data were collected through cross sectional surveys among two female populations in Kinshasa, Zaire. The first study was conducted from March to August, 1990 in four antenatal clinics, with an enrollment of 1,160 women. The second population consisted of 1,222 prostitutes seen at a women's health clinic and enrolled in a larger survey on HIV and STD infection among female prostitutes. Demographic data, a sexual and medical history, and information on current urogenital symptoms were collected on all the women, and a clinical examination was performed.

In order to determine cases of gonorrhea and chlamydia, two algorithms were followed. In this study, algorithms for two different levels of laboratory infrastructure were evaluated. These algorithms were based on the WHO algorithms for vaginal discharge and lower abdominal pain. The first-level flow chart was designed for settings where facilities are limited, i.e., no examination table, gloves or speculum exist, and the patient's symptoms—"vaginal discharge" or "lower abdominal pain"—are the only basis for treatment. The second flow chart includes a speculum examination. Both flow charts are hierarchical, as the presence of abdominal pain or vaginal discharge is the prerequisite for entry. In contrast, a non-hierarchical system allows the consideration of several risk factors, signs, or symptoms at once and the calculation of a probability that the patient is infected.

After these algorithms were applied to the study population, the results were compared with microbiological tests. By this method the number of cases, false positives and negatives,

and sensitivity and specificity of the algorithm model were determined.

Results

The results showed that the two groups studied were comparable with regard to age (mean 25.6 years for pregnant women vs. 26 years for prostitutes). Two thirds of pregnant women were married or lived with one partner, and 20% reported having more than one partner during the preceding year. The prostitutes had a mean number of 8 clients per week. At the time of the survey, condom use was very low (< 10%) in both groups. Overall, 89.4% of pregnant women and 88.6% of prostitutes had never used condoms. The prevalence of STDs except trichomoniasis was significantly higher among prostitutes than among pregnant women. Five percent of pregnant women and 35% of prostitutes were HIV positive. Gonorrhea was detected in 1.6% and 23.4% of pregnant women and prostitutes, respectively. The corresponding figures for chlamydial infection were 5.2% and 13% respectively. Seventy-five pregnant women (6.5%) and 379 prostitutes (31%) had gonococcal and/or chlamydial infection.

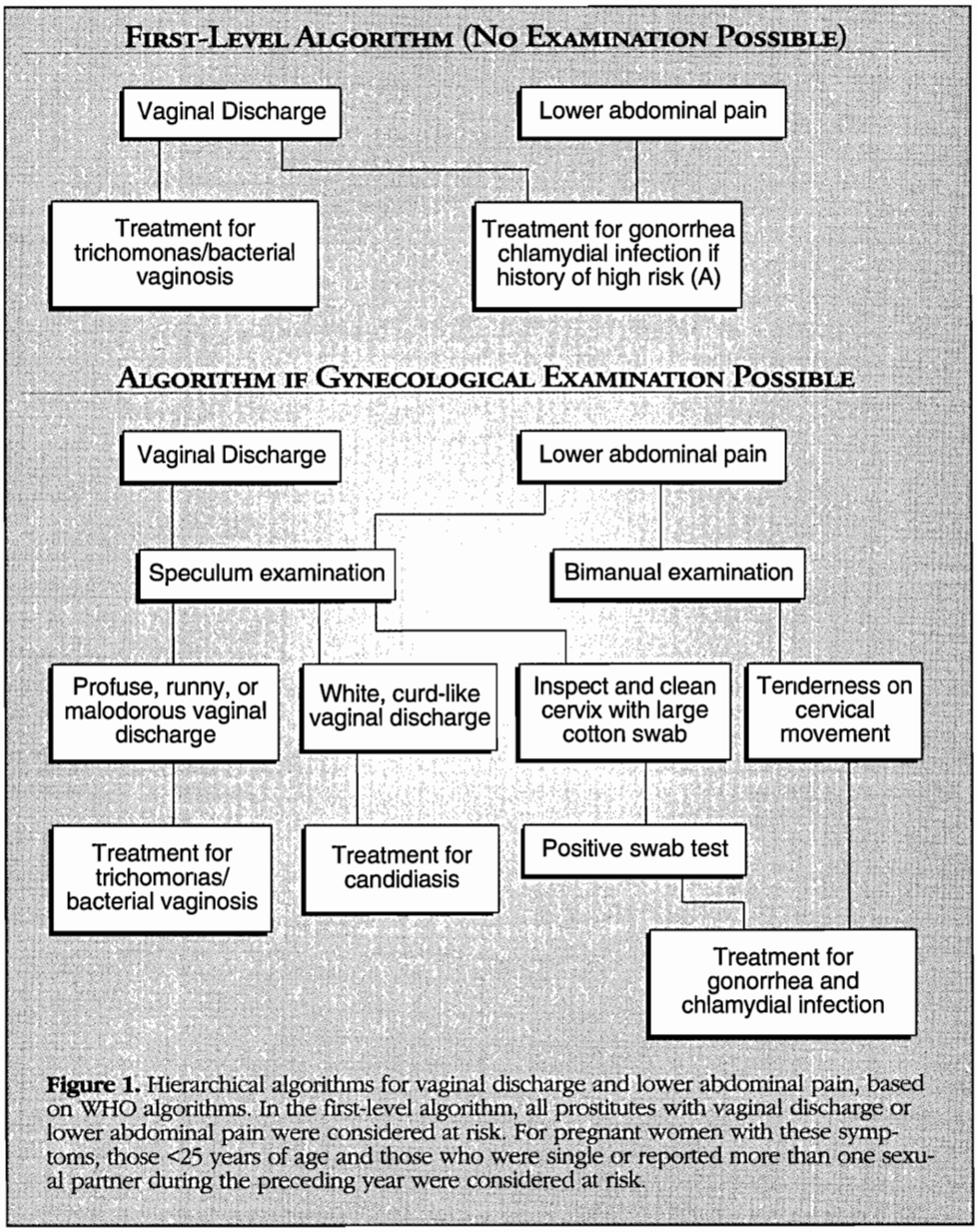


Figure 1. Hierarchical algorithms for vaginal discharge and lower abdominal pain, based on WHO algorithms. In the first-level algorithm, all prostitutes with vaginal discharge or lower abdominal pain were considered at risk. For pregnant women with these symptoms, those <25 years of age and those who were single or reported more than one sexual partner during the preceding year were considered at risk.

Pregnant women with one or both infections were younger than uninfected pregnant women (mean age 22.3 years vs. 25.8 years). Other variables associated with gonorrhea and chlamydia included being single, having had more than one sexual partner over the preceding year, having vaginal discharge or itching as a symptom, having > 10 polymorphonuclear leukocytes per high powered field (PMNs/hpf) in a cervical or vaginal smear, and having a positive LED (leucocyte esterase dipstick) test. Infected prostitutes were significantly younger than uninfected prostitutes (mean age 23.9 years vs. 27.5 years). No single symptom was associated with the presence of gonorrhea or chlamydia in this population. However, the combination of having more than three clients per week and having symptoms (including vaginal discharge, endocervical mucopus, cervical erosion and cervical friability) was associated with infection. In both groups, no single

variable was both sensitive (>60%) and specific (>60%) for the presence of infection.

In settings where microscopy and speculum examination were not possible, the algorithm had a sensitivity of 48% and a specificity of 75.2% for the screening of pregnant women for gonococcal or chlamydial cervicitis; the corresponding figures for female prostitutes were 54.9% and 52.2% respectively. The addition of a speculum examination (tested with pregnant women only) greatly reduced the sensitivity of the diagnostic model to 29.3% but increased its specificity to 85.3%.

Discussion

In this study the association of the classic clinical symptoms and signs with the presence of gonorrhea and/or chlamydia was weak in both a high and low prevalence population. No single sign or symptom reached an acceptable level of sensitivity and specificity combined. Gonorrhea and chlamydia were considered together in the study because they are the two main causes of cervicitis, they are associated with the same clinical symptoms, signs and complications, and the strategies for their control are similar. In both of the populations studied (pregnant women and prostitutes), risk determinants such as age were more predictive of infection than were symptoms or clinical signs.

As an alternative to these hierarchical algorithms, a scoring system was developed that allows simultaneous consideration of multiple variables in the diagnostic approach. The variables used as criteria for entry in this system were different in each population. In the group of pregnant women, single status, more than one partner in the last year, age less than 25 years, report of abdominal pain and a positive LED test were used. In the prostitute group, age less than 20 years received a high score, while age 20 - 29 years was also considered a risk factor but scored lower. Vaginal discharge, cervical mucopus and cervical friability were also scored as risk factors. In both the pregnant women and the prostitute groups, the sensitivity of the score driven system was much higher than that of the hierarchical algorithms. This was true whether the hierarchical system was based on interview alone or on interview plus clinical examination. The reason for this was the low level of sensitivity of the starting symptom of the algorithms based on one variable. A score driven system bypasses this limiting factor by simultaneously considering different variables, including risk markers, instead of relying only on one starting symptom.

The scoring system presented here was a simulation which was used to investigate whether alternative approaches to the screening of women for gonococcal and chlamydial infection are at least theoretically possible. The scoring system needs to be evaluated in terms of field validity and feasibility in different settings and also with regard to replicability in the same population and generalizability to other populations. This study found that risk profiling is valid for pregnant women but that in high risk populations, such as prostitutes, the model should be based on other variables, such as simple lab tests.

The applicability of the hierarchical algorithms in a variety of settings is a matter of concern. Speculum examination may appear very simple, but it is time consuming and is not always possible in primary health care centers or prenatal clinics. In the score-driven method for the evaluation of pregnant women, five questions and LED testing of urine were sufficient. This approach is feasible and economically acceptable in most situations but may require substantive training of health care workers.

Screening for gonococcal and/or chlamydial infections remains a major challenge in women's health care. The commonly used diagnostic algorithms may be useful for symptomatic women in general settings or in STD clinics. Through the incorporation of various risk determinants, symptoms, signs and simple lab tests into a score driven method, sensitivity can be improved but specificity remains rather low. Thus further work on uncomplicated clinical decision approaches and on simple, rapid and cheap diagnostic tests remains a high priority.

Commentary

In resource-poor settings, the capacity to make specific diagnosis on various STDs and provide appropriate treatments is limited by several factors: little or no laboratory services at the primary care levels, the lack of health personnel trained in the management of STDs and the lack of supplies. The World Health Organization (WHO) has developed guidelines to manage STDs by syndrome, including urethral discharge, primarily for men; genital ulcerative diseases (GUDs) in both men and women; vaginal discharge for women and lower abdominal pain for women. The etiologies and pathogenesis of both urethral discharge and GUDs make syndromic management reasonable, but the latter two syndromes are much more problematic. For instance, vaginal discharge can result from at least five different infections, each requiring different management. Since it is impossible to distinguish between them through syndromic diagnosis, treatment is neither feasible nor cost-effective. Thus, to specifically target one or two infections is difficult.

New Technologies for STD Screening and Diagnosis

By David Mercer, Ph.D., Program Officer, PATH

New technologies are being developed to bring STD screening and diagnosis to settings where existing technologies are either unavailable or impractical to use.

Gonorrhea

For gonorrhea, bacteria culturing is generally regarded to be the most sensitive diagnostic method, especially for the detection of infection in women. However, appropriate culture media are either difficult to prepare or expensive to buy prepared, and have a short shelf life requiring refrigeration. This is particularly problematic in resource-poor settings. The Program for Appropriate Technology in Health (PATH) is field-testing and making design refinements on a simple system for culturing gonococci bacteria. The DryCult GCTM system uses filter pads impregnated with dehydrated, stabilized medium which can be rehydrated immediately before use. Shelf life of the dehydrated pads is estimated at one year or more at ambient (tropical) temperatures.

Also currently under field evaluation is a simple, inexpensive portable incubator with a rechargeable power supply. This will enable the collection and culture of specimens at field sites and villages, bringing reliable diagnostic and treatment services to women who may have never had access to them before.

Syphilis

Reasonably accurate, simple serology tests for syphilis infection (such as RPR and TRUST Cards) already exist. However, they operate on plasma or blood serum and thus require venipuncture and centrifugation or clotting of whole blood specimens. This process requires trained phlebotomist, expensive equipment, and can be time consuming, usually resulting in a delay of days before patients receive their results. For syphilis screening in antenatal care and MCH clinics, where follow-up for treatment may be difficult if not impossible, this delay results in many untreated cases.

PATH has adapted a simple means of obtaining and testing plasma for syphilis serology that is currently being evaluated in Africa. The method uses a treated card which separates plasma from whole blood in minutes without the use of a centrifuge. The card uses capillary blood obtained with a lancet, thus eliminating the need for venipuncture and centrifuges. When used with standard serology tests (e.g. TRUST or RPR), results can be determined within a half hour while the patient is still at the clinic and available for treatment.

This article highlights these issues. Most important, it addresses the dilemma of managing various infections in women, in addition to providing effective programs for reducing complications caused by undetected disease. Finally, it brings out some of the common thinking on possible solutions by augmenting syndromic diagnosis with risk assessment.

Scoring systems that incorporate risk markers as well as symptoms and signs may represent affordable alternative methods of screening for chlamydia and gonococcal infections. This study suggests that by incorporating the risk assessment profile, sensitivity was improved significantly over the first level hierarchical system in both pregnant women and prostitutes. Specificity and positive predictive value were no different between the two models. Generally, the specificity was higher among the pregnant population than in the prostitute population. All of these algorithms are dependent on available epidemiological information and knowledge of the STD situation in the local area.

It is important not to stigmatize women and their partners by identifying them as "at risk" through the use of variables, i.e. "injection drug user", "prostitute", or "multiple partners", that have negative connotations in their social setting. Therefore it is essential to couple clinic based RTI management with effective IEC community campaigns in an effort to destigmatize symptoms and to encourage better health care seeking behaviors.

Related to the methods of case detection outlined in this article are the various syndromic management protocols that have been developed recently. These protocols, also designed for use in settings without sophisticated laboratory or diagnostic equipment, look at symptoms and risk factors and treat accordingly.

All of these methods show promise for increasing the effectiveness of case detection and treatment of STDs. These methods must be supported by adequate reproductive health services to meet the demand generated by this increased caseload, and to provide comprehensive services to women beyond the one STD episode that first brings them into the system.

Currently a number of projects around the world are attempting to validate and adapt WHO syndromic algorithms for vaginal discharge and lower abdominal pain. For example, Family Health International (FHI) is conducting studies in Jamaica and Malawi adapting the WHO guidelines. Assessment of scoring systems and validation studies are ongoing in Tanzania, the Philippines, Lesotho, and Haiti.

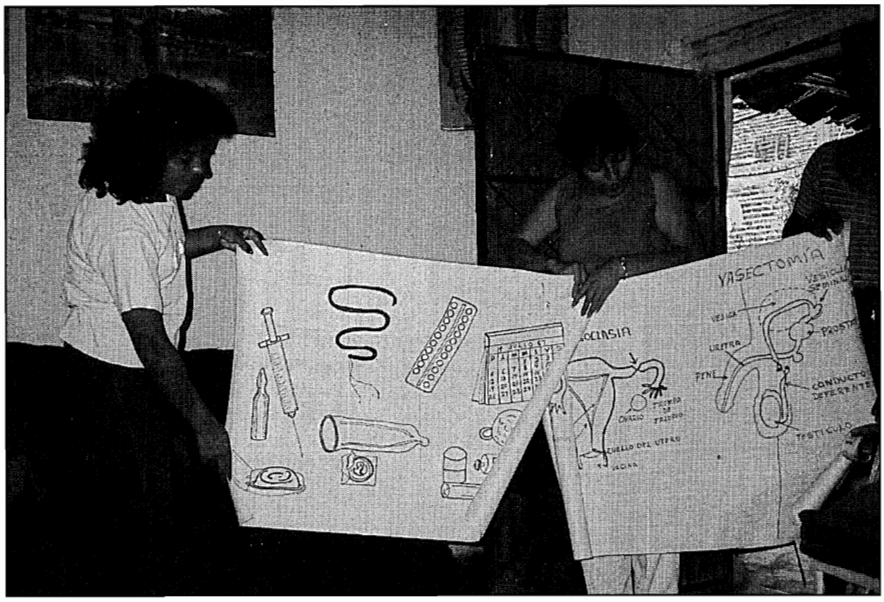
Integration–The Challenge of Incorporating STD Services Into Maternal and Child Health (MCH), Family Planning (FP) and Primary Health Care (PHC) Settings

By Lara Zizic, Intern, MotherCare

The consequences of STDs on women are well documented, ranging from acute distress to death. STDs in women are often asymptomatic, making them difficult to recognize. Untreated infection can lead to ectopic pregnancy and pelvic inflammatory disease (PID), which in turn can result in secondary infertility. Infection in pregnant women can lead to spontaneous abortion, fetal demise, prematurity and infant infection which manifests itself as pneumonia, conjunctivitis, low birth weight and mortality.

To prevent these problems most effectively, integration of STD services into Maternal and Child Health (MCH) and Family Planning (FP) programs is often advocated. Successful integration can be defined as the process of consolidating and combining services and resources in a way that enhances the ability of each to meet its objectives. Integration also allows provision of services at one point, reducing the burden of cost, time and other barriers to access by women.

The rationale for integration of STD control into MCH and FP programs is well founded:



- ✦ Over 80% of women with STDs are of reproductive age, and many of them are infected when they present at MCH and FP clinics;
- ✦ Although STDs are distributed equally between men and women, women suffer more from the consequences of untreated infections;
- ✦ Many women in developing countries seek health care only in association with their pregnancies or infants;
- ✦ MCH and FP programs are natural settings to broach the sensitive issues of sexuality and STDs; and
- ✦ The social stigmatization associated with attending STD clinics is less likely in association with MCH and FP clinics.

Because of these issues, MCH and FP programs are in a unique position to reduce the prevalence and adverse effects of STDs. Typically, MCH programs include services offered for both women of childbearing age and for children under five in a primary health care setting. MCH services generally include prenatal care and may include family planning. In contrast, family planning services with a single focus concentrate primarily on the provision of contraceptives to women of childbearing age.

Components of Integration

Full integration of STD services involves several stages. Each of these stages adds various components that make up a fully integrated STD program. Each component is a crucial part of an integrated program and must be fashioned according to the program context. Various methods, including vertical and decentralized approaches, can be useful in ensuring the integration of STD services into MCH or FP programs. Important program components include:

Planning

- ✦ involvement of all relevant policy makers in the planning process;

Qualitative Research

- ✦ to examine attitudes and behaviors of women, couples and health care providers;

STD Screening

- ✦ training of health care providers in early detection of STDs;

Individual Counseling on STDs and preventive behaviors

- ✦ training of counselors in providing information to clients in a sensitive and appropriate manner;

Information, Education and Communication

- ✦ development or adaptation of IEC (Information, Education and Communication) materials to address realistic STD prevention;

Treatment

- ✦ training of health care providers in treatment methodologies for specific STDs and procurement of medications and adequate supplies for the MCH or FP clinic;

Partner Notification

- ✦ training of service providers in effective strategies of partner notification and provision of partner notification cards to help those infected notify their partners and urge them to seek treatment;

Evaluation

- ✦ creation of appropriate indicators for evaluation and a supervision and monitoring system;

Program Experiences

Past experiences with STD integration in primary health care (PHC) and MCH/FP settings are encouraging. In 1992, MotherCare supported a demonstration project in Nairobi Kenya, directed by the University of Nairobi and the Nairobi City Commission. The intervention consisted of syphilis screening during an antenatal visit using the Rapid Plasma Reagin (RPR) test, immediate treatment, risk-reduction counseling, partner notification and the use of counseling materials on syphilis in ten prenatal clinics in Nairobi.

The counseling materials and activities were designed with both counselors and clients in mind. These included syphilis counseling cards, one each for a pregnant woman and her partners; partner notification cards; role playing between counselors and clients on partner notification; and pamphlets detailing the effects of syphilis and realistic prevention methods. MCH counselors used the pamphlets to educate their clients and reinforce realistic methods of promoting behavior change. The role-plays were intended to help the clients use notification cards to broach the subject of syphilis testing with their partners. While the effectiveness of the materials has not yet been evaluated, there is strong interest by the Kenyan government, the University of Nairobi, and other donor organizations to pre-test and adapt the materials for use in the prevention of other STDs including gonorrhea, chlamydia and HIV/AIDS (MotherCare/The Manoff Group, 1993).

The results of this intervention project include:

- ✦ an increase in new prenatal care attenders screened for syphilis from 60% to 100%;
- ✦ appropriate treatment of those testing positive for syphilis increased from 9% to 85%;
- ✦ 52% of the partners of positive women were treated;
- ✦ 338 cases of congenital syphilis were prevented at a cost of 60 USD per case.

The number of averted cases demonstrates that on-site screening and treatment is feasible and effective.

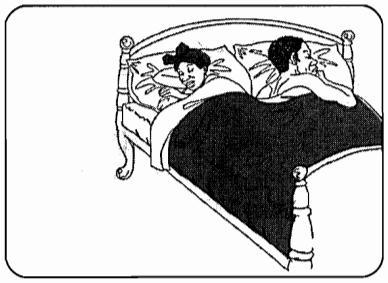
In 1988, a pilot project integrating HIV/STD services into the primary health care system was set up in Maputo City, Mozambique (Bastos et al., 1992). It was executed at the community level by training primary health care workers to use syndromic algorithms to detect and treat STDs. They were also trained to test for syphilis using the RPR test, and for exudative diseases using the gram stain and wet mount tests. In addition, a logistics system and supplies procurement system was set up to ensure that clinics would have adequate supplies of condoms and treatment medications. The majority of patients were managed at local primary care clinics. Complicated cases were referred to a hospital clinic.

The counseling component of the program included individual counseling, free condoms, STD education pamphlets and partner notification leaflets. In addition to counseling, prevention services also included the administration of tetracycline drops to infants born in clinics to prevent ophthalmia neonatorum.

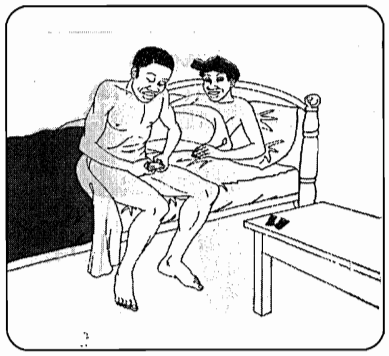
After the first year, the number of referred patients who had gonorrhea declined from 42 to 23. Also, a decline in syphilis prevalence was recorded. The program developed specialized clinical services that were reserved for the most serious cases. After evaluation of screening, treatment and counseling techniques the program was continued and adjustments were made in clinic procedures.

In Thailand, Khon Kaen University, in conjunction with WHO, is conducting a study on the integration of STD services and HIV prevention into MCH/FP clinics. The project includes training programs for "village health volunteers" (VHVs) and clinic-based providers in syn-

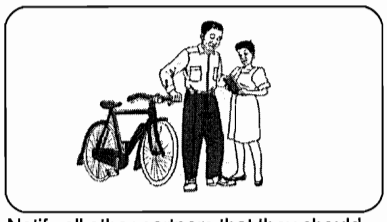
NOW THAT YOU AND YOUR PARTNER HAVE BEEN TREATED



Wait for one week after treatment before you play sex with anyone.

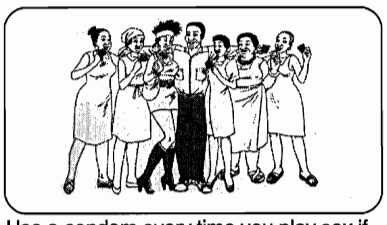


Use a condom each time, especially with your pregnant partner, if you cannot abstain for one week.



Notify all other partners that they should be treated, especially your other wives.

Stick to one steady partner.



Use a condom every time you play sex if you cannot stick to one steady partner.

REMEMBER

Be safe.

Be responsible!

Be respectiful!

dromic diagnosis of STDs and HIV/AIDS, treatment, prevention and counseling. Current IEC materials will be adapted to include information about STD/HIV transmission and prevention (Thongkrajai, 1993).

A number of programs in Latin America have implemented limited components of STD control. For example, in Brazil, Sociedade Civil de Bem-estar has trained the staff in family planning clinics to conduct STD risk assessments as a way to help women reduce their risk of STD/HIV infection (Network, 1994). PROFAMILIA, a family planning organization operating in Colombia, incorporated an HIV/STD communication campaign into their activities. The campaign included information sessions on STD/HIV risk and prevention, a radio campaign advocating condom use for disease prevention and the addition of condom distribution posts. Among the program's benefits, community-based health workers were able to provide their regular services and deliver prevention information. Also, the attitude towards condoms improved and their sales increased (Vernon et al., 1994).

Programmatic Constraints

One concern about integration, particularly among health workers, is the risk of overloading health systems already inundated with demands. While this is a potential problem, effective planning and training of workers seems to prevent system overload. A pilot project in Narangwal, India on integration of essential services such as immunizations and vitamin supplements showed that family health workers spent only half the time on a particular activity under an integrated system that they

had to spend on the same activity under a single-service system (Taylor and Parker, 1987).

Another challenge of integration is the development of appropriate monitoring and evaluation indicators. For example, an integrated STD/FP program has objectives including STD prevention and the practice of family planning by clients. Past indicators of family planning success, such as increased use of contraceptives by women, may not be relevant to STD prevention. An increase in the use of oral contraceptives or IUD insertions will not prevent transmission of STDs. Consequently, information systems for integrated programs must be implemented to address the specific objectives of each component of the program, as well as the effects of integration. These systems must also be able to report on the overall achievements of the program.

Also, measurements of the cost-effectiveness of integrated programs must be adapted. Indicators of integrated programs must account for the fact that the increased initial cost of integration will avoid future expenditures in areas of both the MCH or FP component and STD prevention and control.

Program Considerations

One of the greatest obstacles to the development of integrated programs is the paucity of experience from which to draw. Although there is much rhetoric about integration and its benefits, actual experiences are few. Established programs and the bureaucracies that support them often are resistant to integration if it challenges their traditional bases of support. While integration is an idea that many support theoretically, implementation often proves problematic. As a result, there are few lessons on which to base new programs.

Still, there are a growing number of experiences from integrated projects. Based on these experiences, the following recommendations are suggested:

- ✦ Integrate effective STD services, or other new programs, into well established MCH or FP programs.
- ✦ Ensure adequate numbers of trained program managers and service delivery personnel, with clear supervisory lines established.
- ✦ Ensure that managers provide adequate services and that treatment supplies accompany the IEC programs that are promoting them.
- ✦ Recognize that political constraints may exist due to competition from successful vertical programs and the government structures that support them.
- ✦ Document costs in order to demonstrate the cost-effectiveness of integrated programs.
- ✦ Evaluate data collected to show the feasibility of meeting all the goals of integrated programs in addition to guiding the programs simultaneously.
- ✦ Ensure that policy dialogue among program leaders looks beyond the health rationale for support of integrated programs to the larger social issues involved.
- ✦ Involve community leaders in both the design and implementation of the program to assure its sensitivity to local customs and responsiveness to community needs.

In summary, the feasibility of integrating an STD control program with other existing programs depends largely on the setting of the existing program, including the community it serves, the availability of supplies, the logistical system, and its place within the larger health care system. Integration is currently discussed rather than practiced in most MCH or FP program settings and baseline research must be done to evaluate existing systems and the extent to which integration would be most beneficial. Results of past projects indicate that when well planned, integration can provide multiple benefits to both service providers and their clients.

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A QUARTERLY NEWSLETTER AND LITERATURE REVIEW ON MATERNAL AND NEONATAL HEALTH AND NUTRITION

ON THE PATHWAY TO MATERNAL HEALTH—RESULTS FROM INDONESIA

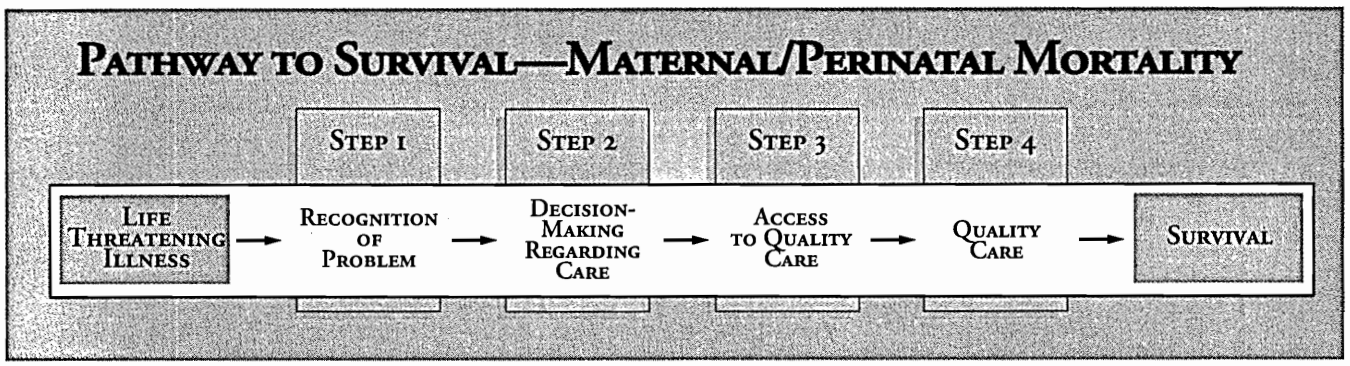
Introduction

With this issue of ***MotherCare Matters,*** we introduce a review of MotherCare's projects during the first phase of the project, 1989-1993. The demonstration projects implemented during MotherCare I focused on the design and testing of interventions to reduce maternal and perinatal mortality and related morbidities. These interventions address the steps on the pathway to survival for women and newborns, outlined below.

Beginning at the point where an obstetrical or newborn complication occurs, there are four major steps that require attention in order to promote the survival of a woman or her baby. Step 1 is *recognition* of the life threatening complication by the woman, her family, traditional birth attendant (TBA) or other provider in attendance who cannot manage the complication. Step 2 is the *decision* to seek care, typically made by family members other than the woman if she is in poor condition. Once the problem is recognized, impediments to *accessing* services must be overcome, such as distance, lack of or cost of transport, geographical or weather constraints, perceived poor quality or attitude of the providers (Step 3). These same problems also weigh heavily on the decision to seek care (Step 2). The last step is the *quality of care* available and provided once services are accessed. Death of a woman, fetus or newborn is more likely to ensue if one of these steps is not taken.

This issue focuses exclusively on MotherCare I projects in Indonesia where two demonstration projects addressed maternal and perinatal health care through different approaches. One project, in Tanjungsari, West Java with Drs. Anna Alisjahbana and James Thouw and their colleagues at the University of Padjadjaran and in the local government district health unit, addressed the need for referral of women from the community, where most births took place, to the district hospital. This project focused on interventions directed at each of the four steps on the pathway to survival.

Qualitative research conducted in Tanjungsari looked closely at beliefs and practices surrounding pregnancy, and shed light on some of



the major issues to be considered in project interventions. Understanding, for instance, that 80-90% of births to Indonesian women take place at home and that the home is the preferred place for delivery, informs project interventions from a local and very pertinent perspective.

A second project in Indonesia, located in Probolinggo, East Java, implemented an antenatal risk scoring system that identified women at "high risk" for perinatal mortality due to risk factors and signs observed or suspected during pregnancy and urged their referral. Dr. Poedji Rochjati and her colleagues at the R.S. Soetomo Hospital worked with a women's volunteer organization (PKK) to assess the risk of each pregnant woman using a risk score card that recommended the place and attendant for birth based on antenatal risk. This project focused on step 1, *recognition of the problem,* along with some access issues (transport and costs).

Interventions such as this one that address the early part of the pathway are designed to prevent severe maternal health problems—reaching women before they are placed in life-threatening situations.

This issue of ***MotherCare Matters*** represents the first time that MotherCare presents results of our own field projects to our readers. We plan this as a continuing activity over the next year, bringing lessons learned from our own work to those working in maternal health programs around the world. Future issues will discuss results from our projects in Latin America and Sub-Saharan Africa. Whether you are in Nigeria reading about Indonesia, or in Bolivia reading about Uganda, we hope the lessons learned provide information useful for your program.

Marge Koblinsky
Director, MotherCare

SECTION ONE

BUILDING A REFERRAL SYSTEM

An Integrated Village Maternity Service to Improve Referral Patterns in a Rural Area in West Java

Anna Alisjahbana, Medical Research Unit, School of Medicine, Padjadjaran University, Hasan Sadikin General Hospital, Bandung, Indonesia with Williams, Claudia; Dharmayanti, R; Hermawan, D; Kwast, BE; and Koblinsky, MA. ***Supplement to International Journal of Obstetrics and Gynecology, 1995, forthcoming.***

Overview

The Regionalization of Perinatal Care, an intervention study conducted from 1989 to 1993 in Tanjungsari, West Java, aimed to develop a comprehensive maternal health program to improve maternal and perinatal health outcomes. The goal of the project was to develop a comprehensive maternal health care program by including the following activities:

- upgrading existing facilities and the training of staff at all levels to ensure the availability of maternal health services, including cesarean section and surgical family planning facilities;
- investing in an emergency transport system, a four-wheel drive vehicle, for the whole subdistrict so that more women could reach existing services;
- establishing birthing homes *(polindes)* in villages on a road where village-based trained midwives could provide services, and equipping the birthing homes with two-way radios to allow communication among the birthing homes, health centers and the referral hospital;

- strengthening all community-based services so that prenatal and delivery care for women without complications was readily available by trained TBAs with access to midwives and the referral hospital in case of complications; and
- implementing a communications strategy to reach families with information on danger signs and use of appropriate services.

Study Design

The study design was longitudinal, following pregnant women over a fifteen month period from March 1, 1992 to May 31, 1993 in an implementation area (Tanjungsari, population 87,000) and a control area (Cisalak, population approximately 40,000), located approximately 60 kilometers apart.

One district hospital provides maternity services for each area. Tanjungsari has three health centers and three sub-health centers. The control area has one health center and two sub-health centers.

Within the formal health care system, women can deliver at the hospital or at health centers with beds, of which one was available in Tanjungsari and none in Cisalak. The preference among women, however, is to deliver at home with the help of a traditional birth attendant.

Data were collected on an ongoing basis on pregnant, intra-partum and post-partum women in order to evaluate the effect and impact of the integrated maternity services. A total of five questionnaires per woman were used. The first was administered to each pregnant woman as soon as the pregnancy was reported, at least by seven months gestation; the second within 24 hours of delivery; the third at seven days postpartum; the fourth at twenty-eight days postpartum; and the fifth at forty-two days postpartum. This provided a complete recording of births, deaths and complications. The analysis presented in this paper is based on the second questionnaire only, and on census sweeps which were used to validate deaths. Pregnant women were usually identified by TBAs and reported to a village volunteer, who provided lists of pregnant women to the interviewers. The TBAs also reported the births they attended.

Study Activities

In the study area, the first eight months were used for preparation and training to improve the knowledge, skills and practices of TBAs and health personnel in all facilities and for preparation of the birthing homes. The following activities were undertaken in Tanjungsari:

- training of physicians and midwives in the health centers and the birthing homes on danger signs and appropriate case management during pregnancy, labor and delivery and the postpartum period, including care of the newborn;
- distribution of home-based maternal and neonatal action records;
- training of TBAs in detection of pregnancy complications and taking appropriate action (referral);
- improvement of the knowledge of women, families and the community about danger signs during pregnancy and deliv-

Birthing Hut (polindes) and staff, Tanjungsari, West Java

ery, and motivating compliance with referral advice through social marketing activities (last six months of the project only);

- ✦ improvement in women's accessibility to health care through development of ten birthing homes in twenty-seven villages in Tanjungsari, and installation of radios and emergency transport;
- ✦ encouragement of the use of birthing homes through a social marketing campaign.

Results

The study results are divided into six sections: antenatal care; antenatal complications and care sought; intrapartum complications and care sought; referral rates and compliance for women with and without complications; the role of birthing homes; and complications and birthing in relation to perinatal mortality rates. In this report, only women with single births were included. The number of women in Tanjungsari and Cisalak with single births during the twelve month study period was 2275 and 1000 respectively.

Antenatal Care

Over 95% of women in both the study and control areas had some antenatal care. While both areas showed few women with no ANC, the rate in Tanjungsari (2.4%) is lower than that in Cisalak (4.1%). However, these apparent similarities are deceiving. The most striking difference between the two areas was the percentage of women receiving antenatal care from a professional provider, 89.6% in Tanjungsari versus 75% in Cisalak. This result is in part due to the positive impact of the birthing home, and the associated educational programs which enhanced access to and demand for care with a professional provider. In Tanjungsari, 5.9% of women had their ANC visits at a birthing home with a midwife.

Antenatal Complications

A difference between the two areas was found in numbers of women experiencing complications in the antenatal period, 19.6% in Tanjungsari in comparison to 14.1% in Cisalak. Two explanations for this are possible—either that there were actual differences between the two areas, or that improved case detection occurred in Tanjungsari due to greater awareness about pregnancy complications resulting from the establishment of the birthing homes.

Women in Tanjungsari who experienced antenatal complications were more likely to seek care from a professional provider than women in Cisalak, although the level in both areas is quite high, 92.5% in Tanjungsari versus 87.2% in Cisalak. Bleeding was generally recognized as a serious complication, driving most women to seek professional care. The one complication to which women responded differently in the two areas was fever for more than three days. Only 68.8% of women who experienced this complication in Cisalak sought care from a professional provider, compared to 92.9% of women in Tanjungsari.

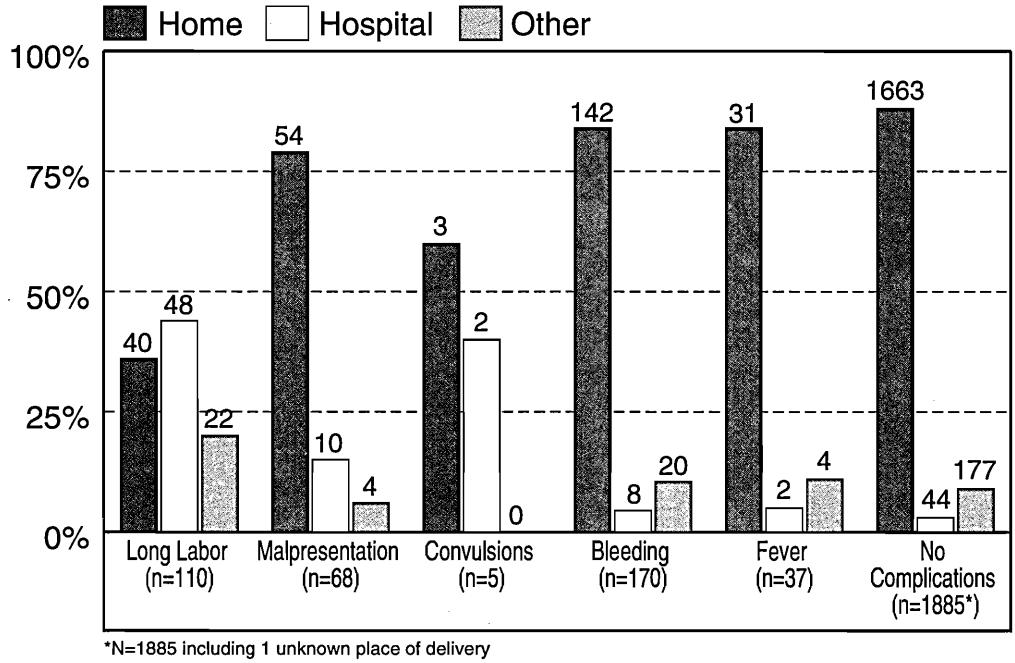
Intrapartum Complications and Delivery Care Sought

The vast majority of women in both the study and control areas were delivered by TBAs (86% and 87% respectively). The site of delivery is, however, slightly different in the two areas—in Tanjungsari, 85% of women delivered at home compared to 96% in Cisalak. Much of this difference has to do with where women with complications sought care.

Bleeding was the primary complication suffered in Tanjungsari, followed by prolonged labor and malpresentation. Prolonged labor led the list of complications in Cisalak, followed by fever and bleeding. For those women in either area seeking outside help, the hospital was the primary choice. There is a highly significant difference in the proportion of women with complications who delivered at a health facility between the two study areas. In Tanjungsari, 120 out of 390 women with delivery complications (30.7%) delivered at a health facility compared to 11.3% in Cisalak. Over 43% of women with long labors from Tanjungsari were found in the referral hospital; most of the others suffering this same complication remained at home. In Cisalak, about 20% of women with prolonged labor gave birth in a health facility with the remainder at home.

Figure 1

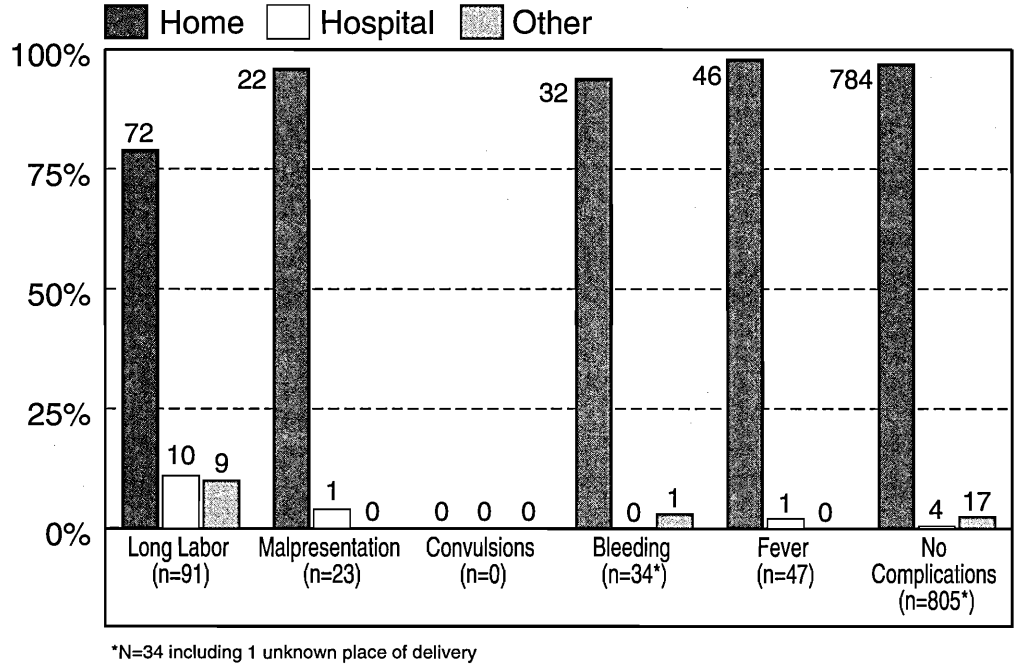
Number and Percent of Women with Intrapartum Complications by Place of Birth—Tanjungsari



*N=1885 including 1 unknown place of delivery

Figure 2

Number and Percent of Women with Intrapartum Complications by Place of Birth—Cisalak



*N=34 including 1 unknown place of delivery

Referral Rates and Compliance for Women with and without Complications

Nearly one third of all pregnant women in the study and control areas suffered any complication(s) during the antenatal and/or intrapartum periods (32% in Tanjungsari and 28% in Cisalak). The overall rate of referral for these women was low—13% in Tanjungsari and 6% in Cisalak—although clearly better in the study area. The pattern of referral in Tanjungsari showed improvement over that of the control area, especially for women with complications in the intrapartum period. Approximately 18% of women with intrapartum complications were referred in Tanjungsari compared with 9.6% in Cisalak. Compliance with referral was also higher in Tanjungsari—84% versus 77% in Cisalak.

The Role of the Birthing Home

The Tanjungsari data show some difference in the rates of delivery in a health facility for women with delivery complications comparing women living in villages with birthing homes *(polindes)* and those living in villages without. In *polindes* villages 36.7% of women with complications delivered in a health facility versus 25.8% of women with complications in the villages without *polindes*. For all women, 19.2% delivered in health facilities in *polindes* villages and 11.9% in villages without them.

Perinatal Mortality

Women who suffer an intrapartum complication are significantly more likely to suffer a poor pregnancy outcome, namely a perinatal death. Although the numbers of perinatal deaths are small and thus difficult to draw conclusions from, it appears that perinatal mortality rates in Tanjungsari decreased, and that they decreased primarily for those women delivered by TBAs, whether the woman had a normal delivery or one with a complication. Deaths in the hospital actually increased, implying that they arrived too late or that they received poor quality care upon arrival. It is possible that this can be attributed in part to the shift in delivery patterns in Tanjungsari, where women with complications were more likely to be referred and to deliver in a health facility with a doctor.

Conclusion

The first step on the pathway to survival for a pregnant woman and for her baby is recognition of a complication. Women were informed of danger signs of complications by their TBAs and midwives, by radio campaigns, and through pictorial pamphlets given out during antenatal care. Based on women's self-reports, the level of complications appears comparable to data from other community-based studies.

Although a major effort was made to train TBAs to recognize and refer women with complications, the low levels of such referrals imply that this is not a simple process. A major problem seems to have been that the TBA is seen as a competitor of the formally trained provider. A TBA's credibility is threatened when a client is referred, as it makes her appear less knowledgeable and competent. Also, TBAs are not always called to assist with complications, as some women proceed directly to the health center or hospital.

By putting birthing homes in the villages and drawing trained midwives into the villages on a known schedule, the problem of access to services was minimized. A greater percentage of women in Tanjungsari had antenatal care with a trained provider, due in part to the birthing homes which were not used to any large extent for birthing. Data suggest that in villages where *polindes* were available, women began to use health facilities more when they had a complication and also that more women from that village delivered in a health facility. Still, since none of the complications can be managed successfully at the community level but rather require hospital management, questions remain about the role that *polindes* can play in the referral process.

The overall results from this study are encouraging—mortality levels for both the woman and baby fell in Tanjungsari following the interventions while in Cisalak they remained the same, but levels were too low to draw firm conclusions about the interventions themselves.

Commentary

Tanjungsari is a relatively isolated community where traditions of home birthing with a traditional birth attendant remain strong. While nearly 90% of women accessed antenatal care services with a professional provider, only 15% used facility-based delivery services even after the interventions were in place. Fifteen percent of deliveries is often quoted as the level of births requiring referral services because of life-threatening complications (i.e., hemorrhage, obstructed labor, severe pre-eclampsia or eclampsia, puerperal sepsis, malposition). But in Tanjungsari, only a third of the 15% pregnant women presenting at the health facilities reportedly had such complications. The majority of women with complications (69%) remained at home.

Among women with intrapartum complications from Tanjungsari, 18% delivered at the hospital. Of the 18%, over half (10.9%) had been referred by a TBA and had complied with the referral. A total of 13% had actually been referred but 2% did not comply. In the control area of Cisalak, only 6.2% of women with complications delivered at the hospital, most having been referred by a TBA from that area. These data show that use of services was higher in Tanjungsari for women with complications, as well as for women without complications. Was it higher because of the interventions?

Pre-post surveys are needed to determine these relationships. While there was no formal baseline for this study carried out in 1992-3, results can be compared with data collected in the same area for evaluation of a Risk Approach project in 1988-89. In that project, TBAs were trained in recognition of certain "risk factors" (previous obstetric history and demographic characteristics, such as age and parity) and "risk conditions" (complications) and told to refer such women to local health centers. There were no other inputs and the questionnaires used in the interviews with women were the same as in the 1992-93 study.

In 1988-89, approximately a quarter of pregnant women complained of a complication(s) during the intrapartum period. Of these, 11.6% were referred by TBAs; this is not dissimilar to the 13% found in the present study. Hence, further training of the TBAs to recognize and refer women with complications did not seem to improve their practice. However, compliance with referral by the family was noticeably higher in the present study—84% versus 64% in the previous study. Families have obviously become more aware of the serious consequences of complications and were more willing to use services in 1992-93. Reasons for non-compliance in the 1988-89 study included "feeling too sick" as the major reason, followed by "not necessary" and "too expensive" (Alisjahbana, 1993).

These data suggest that a focus on families versus TBAs as the primary decision-makers in whether services are used or not when complications are recognized is warranted as they benefit or suffer the most from this action. TBAs, on the other hand, may not be willing to share their clients with their competitors in the formal health sector and hence not refer. *Working with families and communities to recognize obstetrical and newborn complications and bring women and their babies to appropriate facilities may be a more useful intervention than training TBAs to recognize and refer.* Focusing on these first two steps of the Pathway to Survival will not reduce deaths, unless appropriate and high quality services are available and used. But without taking these first steps, no deaths will be averted.

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Qualitative Research Findings: Lessons Learned From the Tanjungsari Regionalization of Perinatal Care Project

Abstracted by Abigail Harrison, MotherCare from MotherCare Working Paper #19 and reports by Carrie Hessler-Radelet and Leslie Carlin

Given the strong preference for home birth in Tanjungsari, qualitative research was conducted to elicit beliefs and practices surrounding pregnancy and delivery. This was done as the preliminary step in developing a communications strategy to increase awareness of danger signs and appropriate use of services should a complication occur. Also, researchers sought to understand whether complications as viewed from the biomedical perspective are considered dangerous or life-threatening by women themselves. This research involved women and health care providers both before and after the implementation of the IEC campaign, with information drawn mainly from focus group discussions and in-depth interviews.

The overwhelming majority of women in Indonesia give birth at home. The focus on the home as the most appropriate place to give birth stems from the traditional belief that labor places a woman in a vulnerable position between life and death—death may come to her, or her baby, as life tries to enter this world. The forces which keep the woman in labor on the side of life may be linked to the home and the "inner calm" *(tenang)* that is found there. TBAs use herbal remedies and massage to keep a woman calm and to ensure a smooth delivery.

Childbirth usually takes place on the floor, on top of a mat covered with a sarong. Typically, women deliver their babies in a room alone with the TBA, with family members frequently "popping in" to see how labor is progressing. Sometimes a female relative will also attend the birth. It is common for neighbors and friends to gather in an outside room to await news of the delivery. After the birth, there is usually a small celebration.

Since planning for an alternative delivery site is considered planning for a negative event, many women will not do so even if referred. Some TBAs reported not wanting to refer women to an alternative delivery site if they knew they would not comply. Even women who comply with referral for a complication during the antenatal period may not accept referral to a site outside the home for the same complication during labor and delivery. Cost, distance and the desire to remain at home are the reasons most often cited by women for not accepting referral. Women expressed a preference for making home a safer place to give birth, rather than making women deliver outside the home. Spending money for a birth that may turn out to be normal is seen as a wasted expenditure. If a complication does arise during delivery, however, most families say they will spare no expense to ensure that the woman and her baby are safe.

Distance is another important factor in women's refusal to accept referral. By putting a birthing home *(polindes)* in the village to remove this obstacle, the average distance from a home in the village to a *polindes* was reduced considerably. Even with this improvement, however, the average travel time from home to the *polindes* remains quite long. At best, the route from home to the *polindes* may be an unpaved secondary road. Alternatively, it may be a dirt path leading up a steep incline or down into a gorge. It may involve fording a stream or crossing a rice field on thin paddy walls. This trip may seem next to impossible for a woman in labor.

Another obstacle to birth at the *polindes* is that when it comes to birth, women appear to have less confidence in village midwives than they do in their own TBA. The Indonesian government has undertaken to place a certified midwife in all 64,000 villages throughout the country. Unfortunately, these community-based midwives *(bidan di desa)* are often young and

inexperienced. Many women feel that their TBA has more experience with birth than the *bidan di desa* who is often unmarried and has never given birth herself.

These reasons to refuse referral are compelling for many women. Many obstacles must be overcome before women will consent to deliver outside the home, particularly those who are poor, live in remote areas, or those who have had uneventful pregnancies previously.

Complications

Women considered problems to be serious if they did not disappear after birth. Bleeding was a condition believed to require immediate action, particularly from a trained midwife. Women were more willing to spend money on the treatment of such serious complications as bleeding rather than problems viewed as less serious or more appropriately cared for by a TBA or other traditional means, e.g malposition.

In contrast, problems that did disappear with the end of pregnancy, such as swelling, that did not cause pain (malposition), were curable or treatable with medicine, such as headaches, were common during pregnancy (swelling) and that did not restrict daily activities were considered less serious or less in need of care. Because swelling will go away after pregnancy, the woman treats it with herbal medicines, application of herbal treatments on the affected parts of the body, or decreased activity. Also, some conditions were considered inevitable or the fate of God, and hence not possible to treat.

Prolonged labor is almost unknown among these women as labor is considered to begin only when contractions are very frequent and there is an "urgent" feeling. Thus, most babies are stated to come within one to three hours of the first signs of "labor". This different cultural definition of labor is but one example of the factors that influence care-seeking, and have an impact on the use of formal health services.

Finally, most pregnant women were reluctant to talk about possible complications, as they

Poster demonstrating importance of using birthing huts for delivery, the presence of trained health personnel, and the availability of emergency vehicles to transport women.

believe that talking may be prophetic. As a result, it is difficult to accurately judge knowledge of such conditions.

Care by Traditional Birth Attendants

Women may seek care for some of the "less serious" conditions, but only from a TBA as they view these problems as within her domain. For instance, one of a TBA's main responsibilities is to perform massage to "correct" the position of the baby. Referral for malposition may not take place until prolonged labor is already underway, as it is considered the responsibility of the TBA to correct this problem.

In Tanjungsari, qualitative data showed that women usually go first to the TBA to confirm their pregnancy, and later to the midwife for an official confirmation. Following the seventh month, visits to the TBA become more regular.

During these visits, the TBA checks the position of the baby and provides soothing massage to help the pregnant woman feel "calm" and "relaxed". These visits are considered very important, as they help a woman maintain the inner calm that is necessary during pregnancy, labor and delivery. TBAs are valued for their experience in birthing and their ability to calm and relax their clients through massage and herbal treatments. Certified midwives, on the other hand, are valued for their technical skills in problem identification, treatment of "complaints" and management of emergencies.

Labor, Delivery, and the Postpartum Period

When asked about complications of labor and delivery, women mentioned the same set of problems, particularly bleeding, malposition and twins. Most women prefer to deliver in the home, feeling that this is a safe place where they can find the necessary inner calm to go through the ordeal of delivery. For the same reason, women stated that they did not plan ahead, as this would disrupt the inner calm, but instead plan for the best-chance scenario, hoping that a complication will not arise.

While many of the maternal and neonatal deaths occur just after delivery, women generally do not seek post-partum care due to a taboo preventing women from leaving the home before 40 days postpartum. Thus, TBAs provide most post-partum care. TBAs sometimes assist their post-partum clients with light housework and child care during the days following the birth. Women in general are not very well informed about post-partum risk conditions. Bleeding is considered a normal part of the birth and post-partum periods, and in some cases excessive bleeding is difficult to assess, and most women have no idea how much blood is too much. Also, fever following delivery was mentioned as a "normal part of the birthing process".

Overall, women's help-seeking behavior is based on a relatively complicated decision-making process, where she balances her perception of the nature of the condition (physical versus spiritual), her perception of the seriousness of the condition, the advice she receives from influential others, the cost of treatment and transportation and the accessibility of care. Different weights are given to different components of this process, depending on the condition.

Commentary

Recognition of complications and appropriate timely action is a major problem. Focus groups with pregnant and recently delivered women in other MotherCare supported projects in rural areas of Bangladesh and Nigeria; in rural areas and urban settings in Jamaica; and a peri-urban area of Bolivia with Aymara and Quechua women, give further insight into women's perceptions of dangers during the three maternal periods—pregnancy, labor and delivery, and the puerperium—and the treatments they consider appropriate.

Strikingly, women in all settings and across countries do not expect complications or problems throughout the childbearing or birth process. Pregnancy is viewed as a normal occurrence, not a dangerous one. The general perception is that if a complication arises, it is fated and little can be done about it.

Bleeding is the exception to this sense of well-being. It stands out as the one maternal complication that commands attention everywhere. During pregnancy, labor and delivery, or in the post-partum period, the extent of bleeding is watched apprehensively— "bad" blood must leave the body but "good" blood must remain. Families across countries ask: "How much loss is too much? And who will know this?"

This focus on bleeding is helpful as a family's decision to *seek care* in response to this complication needs to be made rapidly and the treatment selected appropriate (e.g., move to a medical personnel or facility that can manage the complication). What is considered "appropriate", however, depends on the perception of the interpreter as to the nature of the complication (physical versus spiritual), and the seriousness of the condition. For bleeding, this most

often means seeking medical care, but for other complications, such as obstructed labor believed to be caused by adultery during pregnancy in one country setting, it is perceived to be more "appropriate" to consult a diviner and have sins confessed, rather than to seek a cesarean section from the formal health care system.

In most countries where qualitative research was carried out, malposition is viewed as the domain of the TBA, as stated above for Tanjungsari. In Indonesia, visits to the TBA become more regular for checks on the baby's position after the seventh month. Soothing massage is given to help the pregnant woman maintain the "inner calm" discussed previously. Referral may not take place until prolonged or obstructed labor is already underway, as it is considered the responsibility of the TBA to "correct" the baby's position through massage.

Fever following delivery is considered a normal part of the birthing process in Indonesia, and few recognized it as a serious condition. On the other hand, Bolivian women greatly fear complications in this period and several of the conditions they described included chills and fever. While the woman is treated first at home, she may also go to the hospital if referred because of the perceived seriousness of these complications. Given the taboo prohibiting women from leaving their home until 40 days postpartum, Indonesian women do not seek postpartum care from a formal sector health provider unless and until the situation becomes very grave.

Changing these perceptions—first to recognizing complications as serious, and to recognizing them early and seeking help early—is a major challenge. Age-old traditions of birthing will not be turned around in a few months of IEC campaigns. Recognizing and responding to complications in an appropriate and timely fashion requires a long-term perspective and a sustained effort to direct information to women and those who influence and make decisions about use of scarce resources in the family. At the same time, services must be improved at referral level so that they welcome women, their families, TBAs and others who support women, and so that they can respond effectively to manage the complications.

Two interventions are thus most obvious to save women's lives: efforts directed to the family and other decision-makers to improve recognition of complications and early, appropriate response, and improved quality of care to respond effectively and in a manner that is acceptable to women.

An Antenatal Risk Scoring System: East Java Safe Motherhood Study, Probolinggo District, East Java, Indonesia

Poedji Rochjati, MD, PhD; Prajitno Prabowo, MD, PhD; Agus Abahdi, MD; Benny Soegianto, MD, MPH; Kresnayana Yahya, MSc with Barbara E. Kwast, PhD, MPH, MTD. MotherCare Working Paper #21, January 1995.

Background

The Surabaya Safe Motherhood Program was an effort to test the efficacy of an antenatal risk scoring system designed for use at the household level by the Indonesian women's volunteer movement, the PKK. A previous project (Rochjati, 1990) had shown a reduction in perinatal mortality following the implementation of the risk scoring system in a pilot project with a smaller population in East Java. This study tested that system on a larger scale in another district, Probolinggo, known to have the highest mortality in the province.

The PKK, a cadre of women health volunteers at the community level, used the risk scoring system in their visits to women during pregnancy. These workers were supervised by midwives and health center doctors along with staff from the sub-district health service. In Probolinggo, the health centers have no birthing facilities even though nurse-midwives and physicians are available. Thus, these facilities are bypassed for emergency obstetric care as well as normal deliveries. No midwifery outreach was organized and available during the project period to support TBAs when labor and delivery problems arose. Financial constraints present a severe barrier to hospital access. The study team started at the community level, working to sensitize women to greater use of both prenatal and delivery services through games and pamphlets, with simultaneous provision of two-way radio communication at health center and hospital levels and transport subsidy for women with complications in an attempt to effect an alarm and transport system to reduce maternal and perinatal deaths.

For evaluation purposes, a survey was conducted before and after the implementation of the risk score card in the intervention and comparison areas. In addition, a surveillance system was established in the intervention area for reporting of maternal and perinatal deaths which were subsequently investigated through the verbal autopsy methodology in the home and through a review of records at the referral hospital by physicians affiliated with the project.

The study was a collaborative effort between the Dr. Soetomo Hospital, School of Medicine, Air Langga University and the provincial, district and sub-district health services and village organizations. One urban and eleven rural sub-districts in coastal, midland and highland topographical areas made up the implementation area in Probolinggo district, comprising a population of 544, 748. The maternity services in these sub-districts are organized through eighteen health centers with MCH community outreach activities and two referral hospitals which provide comprehensive essential obstetric functions. A neighboring district, Pasuruan, served as the comparison area.

The Antenatal Risk Score Card

The antenatal risk score card consists of two parts: Part A is for obstetric and reproductive history, and Part B is for obvious complications, such as bleeding and eclampsia, recognizable without physical examination by the PKK, and also suspected conditions that require confirmation by a midwife or physician. Each item of information on the card carries 2,4,6 or 8 points from which a cumulative score is derived at each home visit by the PKK. The total score is grouped at each visit to place women in one of three risk groups: low risk (2-4); high risk (6-8); and very high risk (> 12). The PKK encourage women with a risk score of 6-10 to see a midwife and with a score of > 12 to see a physician. At any time, the allocated score indicates the recommended site for delivery and a corresponding color coded card is posted on the entrance to the woman's house. A green card denoted low risk, a yellow card high risk, and a red card very high risk. Women with a low risk score were instructed that they could deliver with a TBA at home; those with a high risk score with a midwife at home or in the health center; and those with a very high risk score were advised to deliver in the hospital. If complications arose between the time the last score was assigned and the onset of delivery, the attendant would need to decide whether the designated place of delivery needed to change. Scores could not be lowered even if the complication(s) did not present again on successive visits.

Healthy mother and child, West Java, Indonesia

Results

Only key results of the implementation of the risk scoring system are described here. During the one year period from August 1992 through July 1993, 8,457 pregnant women were identified in the implementation area. Eighty-two of these women had a miscarriage. The risk score card was analyzed for 8,375 women who gave birth to singletons during that time. Overall, 69.1% of women were scored low risk (2-4), 29.2% high risk (6-10), and 1.7% very high risk (> 12).

Urban versus rural residence proved more useful than stratifying women by their typological residence—coastal, midland and highland areas. Nearly double the percent of the rural population fell into the high risk scores compared to the urban population (33.2% vs. 17.3%). The most common risk factor was lack of tetanus toxoid immunization (12.2% of all women). Antenatal care was received at least once from trained health personnel (excludes TBA and PKK) by 92% of women in urban areas versus 76.9% in rural areas.

The PKK workers were instructed to increase scores on the score cards if complications occurred during the pregnancy. One major problem of the study, however, was that these scores were seldom revised. For 92.9% of women there was no change in their score, while 6.1% changed once and 1% changed more than once.

The PKK visited the majority of women regularly throughout their pregnancies. Only 7.3% of all women had their last visit prior to the 8th month, 17.6% had their last visit during the 8th month, and 75.1% of women were seen into the 9th month of pregnancy. Thus, the lack of change in scores was not due to cessation of visits by the PKK, but the fact that complications were underdiagnosed or remained unsuspected and the risk groups were determined predominantly by demographic characteristics and reproductive history.

Compliance with delivery advice for the high risk and very high risk groups was very poor, especially in rural areas: 90% of the high risk and 74% of the very high risk women delivered at home in rural areas, versus 60% and 57% in those respective categories in urban areas. With such a high level of home deliveries, it is obvious that the majority of women in all risk groups had spontaneous vaginal deliveries. There also was a marked difference between urban and rural women regarding maternal and perinatal mortality in all risk groups. No maternal death was recorded in the urban area. Of the 26 maternal deaths in the rural areas of the study, 9 were among the low risk, 12 in the high risk, and 5 in the very high risk. All but four of the 26 deceased women were delivered at home (22 out of 26): 8, 11 and 3 women died at home in the three risk categories respectively. Both the perinatal mortality rate and the maternal mortality ratio increased by risk group.

Seventeen of the 26 maternal deaths (65.3%) and 185 of the 345 perinatal deaths (53.6%) occurred in the 33% of high and very high risk populations. The question remains: if women with these risk scores had complied better with advice to deliver with a midwife or doctor in a health center or hospital, could some of these deaths have been averted? Unfortunately, it is not known which antenatal complications the women experienced, nor is information available about possible changes in the risk score between the last visit and the beginning of labor. Since scores never decrease even if a complication no longer exists on the next visit, further complications would have only increased the number of women with higher risk scores.

Conclusion

There is increasing controversy about antenatal risk scoring and no antenatal risk tool is yet available which will predict accurately which women or infants may succumb during the process of childbirth. The tool described in this study is no exception. The sensitivity of this tool for perinatal death was 53%. This means that 47% of women advised that they did not need to deliver outside of the home (low risk) were falsely categorized. The specificity of the risk score card, when high and very high risk are combined, is 69%. This means that 31% of high and very high risk women were actually "false negatives" and would have been unnecessarily referred. This would have contributed to overloading the system.

Using the same method, sensitivity for maternal mortality was 65% and specificity 68%. Because these events are relatively rare, the positive predictive value was extremely low (0.65% for maternal mortality and 6.8% for perinatal mortality). The sensitivity, specificity and positive predictive values (PPV) are not good enough to recommend general adoption of the antenatal risk score card.

While the antenatal risk score card can function as a warning and education tool to recognize complications during pregnancy, risk scoring based mainly on demographic and reproductive factors will not convince women to use a system when they do not believe in the risk markers which allocate them to the high risk

groups. A large proportion of women identified as "high risk" go on to have uneventful deliveries while many of the "low risk" women develop life threatening complications. In addition, most life-threatening complications occur during labor and delivery or in the puerperium, not in the pregnancy period and have few warning signs that are recognized easily by women and family members. Also, there are many other barriers to seeking care for women, such as high transport costs, hospital admission fees, and poor quality care, coupled with cultural factors such as a strong belief that home is the safest place to deliver, as described in the previous section on **Qualitative Research Findings.** A risk scoring system during pregnancy alone does not address these crucial issues.

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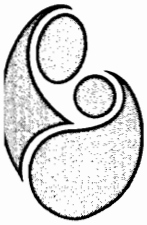

MotherCare™ Matters

A QUARTERLY NEWSLETTER AND LITERATURE REVIEW ON MATERNAL AND NEONATAL HEALTH AND NUTRITION

YOUNG ADULTS—IS AGE A RISK FACTOR?

Introduction

The reproductive health literature is filled with observations about "adolescents" and "young adults". The conclusion: Their vulnerability caused by young age and their lack of access to health services puts young adults at higher risk for pregnancy—and once pregnant, for complications during pregnancy including unsafe abortion, for maternal death, as well as for poor infant outcomes. They are also at high risk for HIV and other STDs as well as for nutritional deficiencies. This issue of ***MotherCare Matters*** reviews the literature to answer the questions: Does young age *per se* affect pregnancy risk for women—making them more likely to suffer obstetrical complications and hence maternal death? What is the impact of young age on birth outcomes and on the health of children born to young mothers? Do young women face a heightened risk of STDs because of their age? This issue explores the basis for the "too young" part of the statement, that women conceiving too young, too old, too close together, or too often, are at "high risk", and tries to answer the question—at high risk for what?

Finally, and most importantly, what types of programs can make a difference in addressing these health outcomes for young adults? While no adolescent program evaluation could be found, expert opinion has led to agreement on specific "essential components" as highlighted in Box 1. Box 2 presents a WHO methodology for determining adolescents' perceptions about their sexuality, deemed a useful beginning for any program focused on young adults.

Who are young adults, and how large is this group?

The World Health Organization defines adolescence as the period from 10-19 years, and complements that broad category with terms that extend the age range—"youth", 15-24 years; "young people", 10-24 years; and "children", 0-18 years. "Young adults" has recently emerged as the preferred term, but "adolescents" still remains widely used. In practice, these terms are often used with considerable variability and overlap.

In 1994, young people (10-24 years) were estimated at almost 1.5 billion, or approximately 1/3 of the world's population. The global teenage population (15 - 19 year olds) was estimated at 513 million. Over half the world's population is under age 25, and more than 80% of the world's youth live in developing countries.

What are the reproductive risks and statistics?

Global trends indicate that the age of menarche and of sexual initiation are falling at the same time the age of marriage is rising. Along with increased education and longer time in school, these trends create a period of defined adolescence that is marked by certain "risk" behaviors. During this period of life, young adults may live on their own for the first time, they may leave school and home, and may be without a traditional family support network for the first time. With regard to reproductive health, a lack of concrete knowledge about sexuality and their bodies puts young people at high risk for various problems. For young women, unintended pregnancy can hurt their chances for the future.

However, statistics vary greatly throughout different regions of the world. The proportion of women worldwide giving birth before age 20 is highest in sub-Saharan Africa, where the average age for first intercourse for women is 16-17 years. Average age at marriage is 18-19 years. In Latin

America, the average age of first intercourse is around 17 for girls and 15 for boys. By age 19, more than 90 percent of all Latin American males have had intercourse, as have 45-60% of females. Fifteen percent of Latin American and Caribbean women give birth by age 18, and nearly 40 percent by age 20, with teen birth rates significantly higher in rural areas. Asia shows the greatest variation, with adolescent fertility rates ranging from 30 to 100/1000 women aged 15 - 19 years old. In the region's poorer countries, more women bear children during their teenage years. An example of this is Bangladesh, where nearly two thirds of women bear children by age 18, and one-fifth before age 15. While having a child immediately following marriage is a tradition in many societies, meaning teen pregnancy may not only be highly desirable but even a societal necessity, the high number of unwanted pregnancies during the teen years continues to be a major issue for all regions. Out of the 150 million births each year, teenage women account for approximately 15 million.

Addressing these issues is high on the agenda of the international reproductive health community. The final report of the 1994 International Conference on Population and Development held in Cairo examined the needs of young adults in its chapter on Reproductive Health and Rights. Objectives of the platform are twofold:

- ✦ to address sexual and reproductive health issues of young adults, including unwanted pregnancy, unsafe abortion and sexually transmitted diseases, including HIV/AIDS, through the promotion of responsible and healthy reproductive and sexual behavior, including voluntary abstinence, and the provision of appropriate services and counseling specifically suitable for that age group; and
- ✦ to substantially reduce all pregnancies among young adults.

The specific articles reviewed in this issue of ***MotherCare Matters*** present an overview of various issues that affect the reproductive health of young people. The first two articles present a review of the literature on pregnancy and childbearing among young women, examining the differentiated effects of physiological, behavioral and socioeconomic factors which can increase risk for the woman (for obstetrical complications and maternal death) and for the fetus/newborn (low birth weight, prematurity and death). A third article presents an abstract of a community-based study of STDs and abortion in young women. We also examine the central role of nutrition in the reproductive health of young women through a review of the findings and programmatic recommendations from a nutrition research program conducted with young women. Finally, we examine program options currently underway, and provide an overview of a methodology developed specifically for use in young adult programs. Together, these articles present an overview of the broad range of issues important to the reproductive health of young adults, and offer some concrete recommendations for solutions.

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The Health Consequences of Teenage Fertility

Makinson, Carolyn. May/June 1985. Family Planning Perspectives, 17(3):132-139.

What is the impact of young age on pregnancy, childbearing, and on infants born of adolescent mothers? This article provides an excellent review and summary of what is known about the consequences of teenage pregnancy and childbirth in the United States and other developed countries, including Canada, France, Britain and Sweden. It attempts to distinguish between a correlation of young age with adverse health outcomes and a direct causal link between young maternal age and poor outcomes. As Makinson states, "Emphasis is given to whether detrimental effects associated with early fertility are consequences of young age *per se,* or of some other factors characteristic of groups with early fertility; to whether such effects can be avoided, or are merely postponed, by delaying childbearing...." (p. 132). In other words, is there an increased biological risk in childbearing for adolescent women, or are there associated socio-cultural and behavioral factors that account for increased risk? Answers to these questions are critical for informed policy and programmatic interventions. To provide answers, Makinson looked at the health consequences of pregnancy in young women for both the mother and the child.

With data drawn from five developed countries, Makinson's discussion focuses mainly on complications of pregnancy and delivery. These studies provide interesting comparisons due to the basic similarities of the societies under study, although the data are not directly comparable due to differences in collection methods, age categories used, and other factors. Social class may not be controlled for in some studies and the representativeness of samples by age and socioeconomic level may be uncertain.

Health Consequences for the Mother

Possible adverse consequences for the mother during pregnancy include mortality and complications of pregnancy and delivery. Several pre-1970 studies in the United States concluded that the adverse health consequences associated with childbearing were greater for younger women than for older women . It is now thought, however, that these studies did not adequately control for socio-economic status and other related factors. As Makinson points out, "Studies that find age differences tend to find them in measures that are sensitive to socioeconomic factors, such as the prenatal complications of toxemia and anemia, rather than in biologically constrained outcomes of labor and delivery" (p. 133).

With regard to obstetric risk specifically, Makinson focused on the mode of delivery, eclampsia (the convulsions of toxemia), and anemia (Table 1). A representative national study in England and Wales contrasted the risks associated with pregnancy and childbirth among the 15-19 age group with those among older women. Teenagers had a higher incidence of anemia, but had no higher incidence of hypertensive disorders or hospital admissions, and they were as likely as older women to have had a normal delivery. A Canadian study looked at the records of 3277 primiparous women aged 17 and younger, 18-19, and 22-26. **Overall, little association was found between age and complications, but an analysis by type of complication showed that older women had more cephalopelvic disproportion and cesarean sections, while teenagers had a higher incidence of hypertension and eclampsia. The incidence of eclampsia was twice as high among the younger teenagers (≤17 years).**

In a British study, a comparison between younger and older adolescents (women aged 16 or less and women aged 17-19) in labor complications and method of delivery showed no differences between the two groups. Based on a small sample—68 births in the younger group and 128 births in the older group—the incidence of forceps delivery and of cesarean section was actually lower for both groups than for all women delivering in those hospitals. Also, the younger women were disproportionately from lower socio-economic groups.

In another study of British mothers aged 12-16, the incidence of pre-eclampsia was low relative to that found in an earlier study of first births among women younger than 25; no increase in operative delivery was found over the general incidence of hospital deliveries and the incidence of prenatal anemia was attributed to socioeconomic factors rather than young age alone. Anemia was also examined in a 1975-78 New York City study of nulliparous women with non-fatal maternal complications. In this study, anemia emerged as a complication occurring more frequently among younger rather than older women. The data did not show a significant age difference for toxemia, although four other studies did. A fifth study attributed higher rates of toxemia among young women to race rather than age. Poor prenatal care was mentioned specifically as a causal factor among the youngest age group. Three of the studies examined women older than 20 and compared them with teenagers younger than 15 or 17, and found a correlation between toxemia and age not found in the New York City study that included only older adolescents.

With regard to maternal mortality, Makinson made an inter-country comparison for the years 1970-72, using data from England and Wales, the U.S., and France. England and Wales had a maternal mortality ratio that is lower for adolescent women than for women aged 20-24; in the U.S. and France it is higher for the younger women. Data from the United States shows a marked racial difference for maternal mortality ratios with African American women suffering more, and suggests that socioeconomic status plays a major role. England and Wales present the opposite situation, with low mortality ratios among adolescents suggesting that the effects of socioeconomic status have been minimized, possibly through better health care.

The issue of use of health care, in particular prenatal care, is frequently brought up in this debate. **Studies have shown that adolescents with adequate prenatal care have outcomes as good or better than their older counterparts. But many adolescent women do not get adequate prenatal care— either no care or late care.** In the United States, 45% of young pregnant women do not consult their doctors until they are more than 3 months pregnant. In Britain, the figure is 27% for a comparative group of 533 teenage mothers. In the U.S. study, 5.6% of pregnant women under the age of 15 received no antenatal care, compared with 1.5 percent of women aged 20-24. Nearly half of the under 15 group began prenatal care in the 4-6 month period, while another 14.2% began in the 7th-9th month. Overall, younger mothers in the U.S. are much less likely to receive prenatal care in the first trimester, and much more likely to receive late or no care.

Immediate Consequences for the Child

Prematurity and low birth weight and hence perinatal morbidity and mortality, are often associated with adolescent childbearing. A lack of adequate prenatal care is often singled out as the culprit here, too. In the U.S., the proportion of premature births doubles in the absence of adequate prenatal care for all ages, with, however, an excess of premature births among very young mothers, whether they have adequate, inadequate, or intermediate care. Data from European and Canadian studies have also demonstrated this correlation between prematurity and age of mother (Table 2).

A 1977 study of stillbirths and neonatal and postneonatal mortality in England and Wales provides another look at the relative importance of physiological constraints and broader environmental factors. According to Makinson, "At birth, when one would expect that increased risk might be governed primarily by biological factors, teenage mothers have approximately the same rate of stillbirths as women in their 20s, and a considerably lower rate than women in their 30s." (p. 136). Data from a later study in England and Wales, as well as other studies in France and the U.S. followed a similar pattern, with only a slightly higher late fetal death rate among teenagers than among women in their 20's. Sweden, however, shows an absence of this age pattern with perinatal mortality, suggesting that the links between perinatal mortality, socioeconomic factors and prenatal care shown in other reports may indicate that higher risk at the younger ages are not inevitable.

Most recent evidence from these studies and others seem to indicate that social and economic factors are responsible for the bulk of the adverse consequences of childbearing

Table 1

Impact of Young Age of Mother on Complications of Pregnancy, Labor and Delivery United States, Canada and Great Britain

Women's Characteristics & Complications	Study Site/Year of Study/Authors				
	New York City 1975-78 A.G. Kohl, 1981	England/Wales 1970 Butler, et al.	Britain ? Russell, 1982	Liverpool 1975-77 Elliot & Beazley	Ontario, Canada 1970-79 Grindstaff & Riordam, 1983
n	?	11,981 women	196 women	263 women	3,277 Primips
Age	15-19 year olds *vs* 20-24 year olds	15-19 year olds *vs* ≥20 year olds	≤16 = 68 births 17-19 = 128 births	12-16 year olds *vs* all deliveries	≤17, 18-19, 22-26 year olds
Anemia	+ teens	+ teens	NA	+ teens	+ teens
Hypertension	NA	Same	+Pre-eclampsia	- (vs women <25yrs.)	+ teens
Eclampsia	NA	NA	NA	NA	+ teens
Toxemia**	Same	NA	NA	NA	NA
Obstructed Labor	NA	NA	NA	NA	- teens
Puerperal Condition	Same	NA	NA	NA	NA
Cesarean Section	NA	- Primip teens	Lower for both groups *vs* all hospital deliveries	Same	- teens *vs* 22-26 yrs
Labor Complications	NA	NA	Same	NA	-teens

* + or - means higher or lower incidence of condition for teens respectfully
** Toxemia was reported in the article, without distinguishing hypertension, pre-eclampsia or eclampsia
Source: Adapted from C. Makinson, 1985.

Table 2

Impact of Young Age of Mother on the Outcome of Pregnancy for the Infants

Infant Complication	Study		
	British Birth Study Butler et al., 1981	France INSERM, 1978	Canada Grindstaff & Riordan, 1983
Low Birth Weight	-	-	+
Prematurity	+	+	+

* + or - means higher or lower incidence of condition for teens respectfully
Source: Adapted from C. Makinson, 1985

among young women. Young age does not appear to be the prime culprit. Age matters, but only to the extent that most young women bearing children, especially during the teen years, may also suffer such problems as low educational attainment, marital instability or single parenthood, and poverty.

Commentary

Makinson's review of studies conducted in five developed countries concluded that most evidence points to the importance of behavioral factors, particularly the lack of adequate prenatal care (as referred to by many of the authors of the reviewed studies but not explored further by Makinson), rather than to the age of the mother as the direct cause of such pregnancy complications as pregnancy-induced hypertension and anemia, such obstetrical problems as toxemia and operative deliveries, and such birth outcomes as low birth weight, stillbirths and perinatal mortality. Where maternal age seems most likely to have a direct consequence is on prematurity of the newborn, according to the studies reviewed in this article. This finding is further explored in the following article by LeGrand and Mbacke.

A minimum of data on maternal age in association with obstetrical complications and maternal death is available from in developing countries. The reason for the paucity of data is obvious: With over 60% of pregnant women in developing countries delivering in their home, most obstetrical complications suffered and maternal deaths go unreported. Asking women in a household survey to describe complications suffered during pregnancy or childbirth is fraught with difficulties. Many complications, such as anemia or hypertension, generally are "silent"—they go unnoticed, or their symptoms are similar enough to those generally experienced in pregnancy to make it too difficult to disentangle them. Serious complications of childbirth such as hemorrhage, obstructed labor or sepsis, may not be able to be determined by women due to the crises at the time they are suffered and because the WHO definitions of these complications are quantitative or time-dependent (e.g., a hemorrhage is equal to or greater than 500 ml. of blood).

To overcome such problems, a study by the Philippines' Ministry of Health and Macro International developed algorithms of signs or symptoms of the most life-threatening complications through a hospital-based validation exercise (Stewart and Festin, 1995). These algorithms were then used to identify respondents with symptoms of these complications during a survey of nearly 4000 women who had given birth at least once in the prior 3 years. By restricting the definition to only those most life-threatening maternal complications, 12% of women were identified. Hemorrhage was the most common complication (8%), followed by cesarean section due to obstructed labor (3%), severe infection (2%) and eclampsia (1%). **Clustering the data on complications by age group shows that the proportion of women suffering specific complications did not vary significantly by the age of the woman (Table 3). This was also the case for parity.**

Eclampsia (convulsions, the end stage of toxemia) is the rarest of these major obstetrical complications, typically experienced by less the 1% of pregnant women. Hence the numbers in the Philippines study are too small to determine the significance of maternal age on eclampsia. But in Jamaica, eclampsia has been reported as a major problem. There maternal age was linked with this complication: Younger women were more likely to develop eclampsia while older women were more likely to develop hypertension, but not experience eclampsia to the same degree as their younger counterparts (Ashley, undated). Working with small numbers, however, the authors did not distinguish between the effects of age versus the behaviors of those in their teens.

One obstetrical complication more likely to be suffered by young women is septic abortion, not because of age *per se,* rather because of behaviors driving them to have more unsafe abortions. Globally, young women account for a significant share of the total number of legal abortions. They also tend to get later and riskier abortions from non-professional providers even though unsafe abortion is known to be a major cause of maternal mortality. Hospital studies in Africa show that young women account for 30-80 percent of all patients with abortion complications. In Nigeria, for instance, young women are responsible for

Table 3

Symptoms of Obstetric Complications by Maternal Age						
	Percent of Births for Which Respondents Had Symptoms of Obstetric Complications					
Age Group at Event	C-section Obstruction	Hemorrhage	Eclampsia	Severe Infection	Percent With Any Symptom	Number of Births
<20	1.1	6.6	1.3	2.6	10.0	334
20-34	2.4	6.6	0.8	1.9	10.5	3,585
35+	2.7	6.8	3.0	3.0	12.6	838

Source: National Statistics Office (NSO) [Philippines] and Macro International Inc. (MI). 1994. *National Safe Motherhood Survey 1993*. Calverton, Maryland: NSO and MI.

45- 65% of hospital admissions with abortion complications. These complications also can lead to chronic morbidities and infertility.

Given that maternal mortality is a very rare event in developed countries, Makinson did not try to use the very small numbers to distinguish between age and behaviors as the causative factor of the slight increase in the maternal mortality ratios reported at young age. Similarly, a study comparing maternal mortality among developing countries (Sri Lanka, Venezuela, and Mexico) showed a slight increase in the ratio among women in their teen years (Graham and Airey, 1987) but could not distinguish between possible risk factors given the small numbers. Even so, these authors strongly suggest that programs focused on reducing maternal mortality of women under 20 (or over 35) years of age, are inefficient and ineffective given that these women have a lower probability of being pregnant than those between 20 and 35 years old. Even in a country with very high adolescent pregnancy rate, e.g., Bangladesh, they show that the greatest proportional contributors to births and maternal deaths are women in the 20-35 year old age group.

Taken together, these data suggest that young maternal age is not a risk factor for obstetrical complication (with the exception of unsafe abortion and possibly of eclampsia). Nor should young adults be the primary focus of programs aimed at decreasing maternal mortality, as the bulk of pregnancies and of maternal deaths among women are in the 20-35 year old age group.

Determining the impact of maternal age on birth outcomes for the newborn (low birth weight and prematurity) will be dealt with in the next abstract and commentary.

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Teenage Pregnancy and Child Health in the Urban Sahel

LeGrand, Thomas K. and Mbacké, Cheikh S. M. May/June, 1993. Studies in Family Planning, 24(3):137-149.

More than 20,000 births occurring in Bamako, Mali and Bobo Dioulasso, Burkina Faso, which occurred over a one-year period, were followed for two years to study the effects of young maternal age on child health and birth outcomes, including birth weight, child health care and feeding behavior, and child mortality. Investigators used prospective surveys entitled "Enquete sur la Mortalite Infantile dans le Sahel (EMIS)" [Survey on Infant Mortality in the Sahel] in both cities to gather data for a cohort of children born to resident mothers and registered from April 1, 1981 to March 31, 1982 in Bobo Dioulasso, and April 1, 1982 to March 31, 1983 in Bamako. These children were then visited at one month, four months and every four months after that for the duration of the study.

The authors examine the prevailing explanations for poor birth outcomes among teenage women—biological, behavioral or noncausal correlation. It is often stated that young mothers may be too physically immature to handle the demands of pregnancy, and that in developing countries, where women's physical development is slower and menarche is later, the risks of pregnancy are heightened. Pregnant teenagers are reported to face greater risks of pre-eclampsia, cephalopelvic disproportion due to pelvic bone immaturity, and higher incidence of prematurity and prolonged labor. In addition, physically immature girls may compete with the fetus for essential nutrients, and many studies show that teenage mothers have a higher proportion of low birth weight babies. Also, an extremely high percentage of teenage births are first births, which also connotes higher risk.

As in the articles reviewed by Makinson, the role of behavior versus physiology needs to be carefully examined here. As the authors state, "The behavior of teenage women may be *ceteris paribus* less conducive to good health in children." (p. 137). Young women are less experienced and are less mature. Indirectly, such factors as many teenage women are in school when they become pregnant may also influence birth outcomes. Embarrassment and shame often force young women to leave school when they are pregnant, or they may try to hide their pregnancies through dieting, refraining from seeking medical care, or seeking an illegal abortion.

In Africa, these events occur in a context of the highest teenage fertility rates in the world, according to the United Nations. Marriage and first births occur in the teenage years in much of subSaharan Africa, and the relative risk of death before age five is about 46% higher for children with mothers under 18. In urban areas particularly, teenage pregnancy rates are likely to rise in the near future due to the weakening of traditional society. The authors highlight an emerging phenomenon: "...development will bring falling ages at menarche, rising women's ages at marriage, and a progressing 'emergence of adolescence'—a distinct period between menarche and full entry into adult life. As these changes tend to occur first in the rapidly growing cities, the special needs of unmarried urban teenage women will increase in importance over the coming years." (page 138). As the authors note, distinguishing between the alternative explanations for the link between young maternal age and child health is critical for the design of effective health interventions.

Data and Methodology

The authors took measures to limit the possible effects of sample selectivity. First, the neonatal period is dropped from the analysis; the neonatal period data are presumed flawed due to underreporting of perinatal deaths and loss to follow up. Two means were used to reduce the effects of losses from observation between survey rounds on mortality determinants: regressions were estimated by a discrete hazard approach and, in calculating cross-tabulations, observations were weighted according to the length of time that children remained under observation.

A dummy variable known as the "school girl variable" was also created to serve as a proxy for

unwanted pregnancies among in-school girls. This variable indicates that the mother was under 20 and unmarried at the time of the birth, that this was the first birth, and that she reported having a secondary level or higher education.

Results

The authors examined the effects of mother's age at childbirth on health care sought. They looked at two measures of prenatal care—whether a woman had any prenatal visit at all and whether she had an early visit, defined as a visit occurring in the first four months of pregnancy. The authors hypothesized that early visits are an indication of existing differences in health seeking behavior, since these early visits are less likely to be affected by mothers' perceptions of problems in their pregnancies. **The results from both areas clearly show that teenagers are less likely to seek early prenatal care than are women aged 20 years and older.** While this is also true of any prenatal care, results are not so pronounced. In Bamako, 36.6% of pregnant women aged 14-17 sought early prenatal care, versus 42.8% of those 20 and above (a significant difference). In Bobo-Dioulasso, the figures for those same categories were 9.6% and 22.9%, respectively, a very significant difference. In general, most health service statistics were better for Bamako, where more extensive health facilities are available.

To better estimate the age effect, the data sets were pooled in order to do logistic regression, controlling for the effects of other socioeconomic and demographic variables. Here, too, the results indicated that teenagers are less likely to seek prenatal care compared with mothers aged 25-39. Differences were more pronounced for early visits than for any visits, and show that the youngest adolescents demonstrate the least healthy behavior. This analysis also showed that women aged 20-24 are less likely to seek early prenatal care than women 25 and older, suggesting that the adverse effects of young age on prenatal care seeking behavior continue beyond the teen years.

The use of the "school girl" variable showed a strong, negative and highly significant effect on prenatal care behavior, in both categories of early and any visits. Other socioeconomic factors showed predictable results: women's schooling, marital status and socioeconomic status all influence the likelihood of seeking prenatal care.

Vaccination status for TB, measles and DPT of children at one year of age was examined as a measure of child care. Children with teenage mothers were less likely to be vaccinated, although significant differences were found mostly in Bobo-Dioulasso. In Bamako, results showed that women under age 18 were significantly less likely to provide their children with a full set of DPT vaccinations, which requires greater parental attention than other immunizations. The introduction of supplementary foods by 6 months, another measure of the adequacy of child care, did not appear to have significant differences between younger and older mothers in either area. However, mothers in the 14-25 year old age group are more likely to wean their children by 24 months than mothers aged 25-39. The school girl variable showed no independent influence on these findings, with the exception of DPT where a negative effect was significant.

One area that showed highly significant differences between younger and older mothers was that of birth weight. **Using the standard measure of less than 2,500 grams for low birth weight, babies of teen mothers in both areas were found to have close to twice the probability of being low birth weight than babies born to older mothers.** In addition, babies born to teen mothers in both cities were found to be more than 200 grams lighter at birth than other babies. **The bulk of this effect was found not to be due to differences in prenatal health care seeking behavior.** Children of mothers classified as "school girls" tended to have lower birth weights, although this was not significantly different from the reference group (mothers aged 25-39). First births were significantly lighter and at higher risk of being low birth weight. As would be expected, girls and multiple births had lower birth weights, as did poorer babies and those born to uneducated mothers.

Another important area is that of infant and child mortality. The risk of dying was found to be greater for children born to teenage mothers. For the period from 1-23 months, the risk of mortality was calculated to be approximately 45% higher than those of

other children, with children of the youngest mothers (≤18) facing the highest risks. These relationships were examined independently of birth weight, with results showing a very similar effect. Thus, in this study the adverse effect of teenage motherhood on the mortality risk of her children appears to be largely independent of initial health status (e.g., low birth weight) and most pronounced in year 2 of life. This is an important finding in the face of previous studies that have associated poor outcomes with the physiological problems (low birth weight) of young childbearing. Given that the birth weights of infants in this study were known to be low, this is a surprising finding. It has strong implications for the often assumed biological basis for the adverse effects of young maternal age on child health.

The results detailed above demonstrate that children born to teenage mothers face striking disadvantages. **These infants weigh less at birth, which appears to be mostly due to maternal age, not her health care seeking behavior. But the subsequent impact on child mortality (increasing as the child ages from 1 to 23 months) does not appear to be mediated through the birth weight factor, rather the data lend support to a behavioral explanation.** These behavioral factors not only include the mothers healthcare seeking behaviors for the child, but also may be due to the child's own health risks as s/he is weaned and begins to be mobile. However, the significant and large effect of young maternal age on child mortality argues for programs that promote later childbearing.

Commentary

The direct and independent effect of young maternal age on birth weight found in this large study from two urban sites in Africa runs contrary to the conclusion drawn from a meta-analysis of 144 studies that also investigated the effect of maternal age on gestational age, prematurity, birth weight or intrauterine growth retardation (IUGR) (Kramer, 1987). In that analysis, 12 studies were singled out as having satisfactorily met specific methodological standards. No age effect was found in what was cited as the largest (sample size 31,604) and best of these studies. Although this particular study was in the United States, **two highly qualified studies from developing countries, Guatemala and India, also reported no independent effect of maternal age on birth weight.**

Given the emphasis in the literature on the risks of poor outcomes for women who are too young (≤16 years) or too old (≥35 years), Kramer looked at these age groups separately. **For young adolescents, the data from two methodologically sound studies quite clearly show no independent effects on birth weight; four other studies demonstrate no independent effects of young age on gestational age, prematurity, birth weight or IUGR.** The data for older women are not so clear, but rather conflicting results are reported from different studies. Kramer suggests that older women may be more sensitive to the adverse effects of other factors. Similarly, he concludes that age, and specifically very young age, may indirectly influence birth weight, IUGR, or gestational duration through such factors as maternal height, pre-pregnancy weight, nutrition, cigarette smoking or other substance abuse (Kramer, 1987).

Why the difference with the results reported by LeGrand and Mbacké? Perhaps there is not so much difference, as both sets of authors equivocate in their conclusion. **LeGrand and Mbacké state, "Young maternal age was found to have a strong, negative effect on birth weight.... However, the entire effect of maternal age cannot be attributed to these mechanisms; prenatal health care and perhaps other behavioral differences also play a role." (p. 147). They did not control for such known risk factors for low birth weight as maternal height, pre-pregnancy weight, or nutrition during pregnancy, which Kramer did take into account in his analysis, and implies in his conclusion that it is these factors that drive the relationship between young maternal age and birth weight, not young age *per se*.**

The other surprising finding of this African study is the lack of association between birth weight and early child mortality (1-23 months). Again this finding runs contrary to other studies. LeGrand and Mbacké pursued the possible effect within the neonatal period, although they report that the results are highly tentative given that a large num-

ber of losses to observation were experienced in this period that are associated with socioeconomic status and deaths at childbirth. **From the regression analysis, they found that the clear survival disadvantage faced by children born to the youngest teens (<18 years) disappeared after controlling for the effects of birthweight, suggesting that birthweight is a key intermediate variable in the adolescent fertility/neonatal mortality relationship.** For children of older mothers, controlling for birthweight did not alter the estimated (insignificant) effect of mother's age.

Given the association of young maternal age with child mortality, even if not mediated through birth weight, one intervention strategy remains clear—postpone teenage pregnancies. This means family planning and information, education and communications programs directed specifically to those in their teens, primarily for reasons of their high risk of childhood mortality due to behavioral issues. The controversy of the association between young maternal age and low birth weight, and birth weight and infant/child mortality, raised in the LeGrand and Mbacké study, warrents continued exploration to improve future programming.

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Box 1

Components of Successful Adolescent Reproductive Health Programs

While comprehensive evaluations are lacking, a wide range of experts in the field of adolescent health agree on a few critical components of adolescent health programs. The starting point for such programs is to listen to young people's concerns and understand how they perceive their own needs.

Essential program components include:

Counseling and Services

Sexuality education is likely to be most effective when it is interactive and participatory. An emphasis on transmitting information rather than engaging adolescents in dialogue about their needs is likely to fall flat in this age group. Counseling, based on a relationship of trust and ongoing dialogue, is essential to provide the support that young people need in exploring issues of sexuality. Appropriate information materials are needed that are pertinent to adolescent experiences and written in a style that engages interest. Provided in the context of broader services designed for adolescents, specific reproductive health needs can be addressed in an "adolescent-friendly" environment. These linkages are essential to provide access to contraceptive and other reproductive health services, helping youth to translate knowledge into action.

An example of this type of counseling for adolescents is the MEXFAM (Mexico Family Planning Association) program that provides sexual guidance courses to young people as well as to parents and teachers, using a participatory technique based on five principles—dialogue, responsibility, life planning, equality between men and women, and mutual respect. The program is adapted from the Center for Population Options Life Planning Education Curriculum. In Guatemala, the family planning association, APROFAM, has organized discussion groups between young people and their parents.

Youth Participation

Model programs such as Gente Joven/MEXFAM, Mexico, the Kenya Youth Program, and the counseling center of the Family Guidance Association of Ethiopia have fostered participation by promoting the use of adolescents as "peer educators", both to reach out to other teens and to provide continuous feedback to program planners. This type of activity helps to build self-esteem and impart confidence to young people; working through difficult topics such as discussion of sexual activity, contraceptive use and relationship issues may prove easier and seem less judgmental with peers.

The Youth Counseling Services and Family Planning Education Project of the Family Guidance Association of Ethiopia train youth, including peer promoters, in family life and sex education. The center also provides informal counseling and provision of condoms and spermicide by peer promoters, educational activities in the centers and schools, including the showing of films, sex education discussions, distribution of information materials, staging of youth drama performances, and production of youth radio programs.

Monitoring and Evaluation

First and foremost, the sexual health needs of the youth involved must be assessed. Then, programs must be evaluated according to these topics. New standards of evaluation are necessary for adolescent programs. Of paramount importance is feedback from adolescents themselves, and so youth involvement in the evaluation process is also necessary. It is a learning process that is being evaluated, rather than meeting targets or goals.

The MEXFAM program is evaluated through monthly reports by program coordinators and through use of an "indicator of the well-informed user", which measures the level of young people's knowledge after they complete an education program.

Community Involvement

Initial work on explaining a program's objectives to parents, teachers, religious groups, the media and other influential persons is essential to overcome opposition based on fear and mistrust. Also, health care providers must be sensitized to the needs of youth—without training, many will treat adolescents as they treat adults. In addition, many health care providers may be biased against adolescent sexual activity or contraceptive use and thus not be open to providing necessary services.

"Under Twenty Clubs" operated by the Grenada Planned Parenthood Association (GPPA) provide a central location for youth to gather. The GPPA's Youth Health Clinic and Development Center includes a family planning clinic. In addition to sexual health education activities and training of peer counselors, the program does outreach to schools and other groups and creates programs for radio and television.

Other model programs include the Association Salud Con Prevencion in Bogota, Colombia, which provides services for pregnant adolescents as well as maternal health care and education for new mothers; the Centra Mitra Muda of the Indonesian Planned Parenthood Association in Jakarta, which has, among other services, a telephone hotline for counseling; and Kabalikat in Metro Manila, the Philippines, which provides comprehensive reproductive health services for youth along with empowerment workshops and educational materials; and others such as Prerana—the CEDPA Better Life Project in Uttar Pradesh, India; Dial-a-Friend of the Foundation for Adolescent Development in the Philippines, and the Kingston, Jamaica Calabar High School Drama Troupe.

Adapted from Koontz and Conly. 1994. "Youth at Risk: Meeting the Health Needs of Adolescents" in Population Policy Information Kit, #9. Population Action International; and Hawkins and Meshesha. 1994. "Reaching Young People: Ingredients of Effective Programs" in Sen, Germain and Chen. Population Policies Reconsidered: Health, Empowerment and Rights. Boston, MA: Harvard School of Public Health.

Reproductive Tract Infections and Abortion Among Adolescent Girls in Rural Nigeria

Loretta Brabin, Julia Kemp, Orikomaba K Obunge, John Ikimalo, Nicola Dollimore, Ngozi N Odu, C Anthony Hart, Nimi D Briggs. *February 4, 1995. The Lancet, 345(8945):300-304.*

This study, carried out in a rural community in southeast Nigeria, was designed to obtain demographic, clinical, and microbiological data on several indicators of reproductive health among adolescent girls, including induced abortion, and reproductive tract and sexually transmitted infections, which are known to be associated with high risk of morbidity and mortality for both women and newborns.

In November and December, 1992, all households in the community of Kegbara Dere (K'Dere) in Rivers State, were visited to establish the population of women. Women were informed about the objectives of the study, and information was also given through women's organizations and other community institutions. One investigator (JK) lived at the site throughout the study.

It was not acceptable to the community to interview adolescents only, so a random sample of women aged 20 years and above was invited for interview and examination. Exclusion of some women through random selection proved unpopular and, after several weeks, all women of reproductive age (20-49) were invited. Pregnant women were excluded. All menarcheal adolescents (10-19) were then invited to participate.

Interviews and examinations were held between January and July, 1993 at the health center. Sexual activity was determined through a private interview with a specially trained midwife who spoke Ogoni dialect. Much time was spent talking to groups of girls before interview to explain procedures and assure them that information would be confidential. Surveys entailed a questionnaire, a general and abdominal examination, and gynecological examination and microbiological tests for women who reported themselves sexually active.

A questionnaire was developed that included questions about age; educational status; marital, pregnancy, and abortion history; and history of vaginal discharge and treatment, menstrual problems, and contraceptive use.

An extensive gynecological examination was done by one of two Nigerian doctors supervised by a consultant gynecologist. Samples taken for candida, trichomonas, gonorrhea, chlamydia and syphilis were transported to a laboratory at Port Harcourt within 4-6 hours of collection. Women with vesico-vaginal fistulae, uterine prolapse, tumors, suspected pelvic inflammatory disease, or suspected ectopic pregnancy were referred.

A total of 868 females were interviewed and examined. House to house visits and interviews established a population of 439 menarcheal adolescents, of whom 93.4% (410) attended for interview and examination. 5.9% refused to attend for interview and 0.7% were sick or recently delivered. Among women aged 20 or more, 88.0% (458) of eligible women attended for interview; 11% refused and 1% did not attend because of sickness or a recent delivery. Only 11.2% of girls under 20 were married. Parities were high with a mean of 8.2 live births among women aged more than 40. Available data suggest that primary infertility was uncommon; only 3.1% of sexually experienced women over 25 had never been pregnant.

Almost half (43.6%) of adolescents less than 17 reported themselves to be sexually active. Of girls under 17, 17.8% reported at least one abortion, and abortions were reported by one in five (21.2%) of those aged 17-19. There were no abortions reported among girls aged 12 and 13. Reinterview of a sample of 97 sexually active women showed substantial under-reporting, which decreased with age. 41% of adolescents who initially reported no abortion or did not respond to the question later admitted to an abortion. The abortion rate, therefore, could be as high as 22% among girls less than 17 and 43% among 17-19 year-olds. This high rate of abortion parallels low contraceptive use: only 5.3% who had ever had sex reported ever using a modern contraceptive and only 14% of married women were currently using any modern form of contraceptive.

Vaginal discharge was reported by 82.4% of adolescents and 63% of women over 20. Although itching was frequently reported, especially among adolescents (46.6%), few (2.8%) had sought treatment of any kind, including traditional medicine.

Compliance with the gynecological examination was high: 96.2% agreed to physical examination, and 94.1% of sexually active adolescents and 97.6% of sexually active women 20 years or over had a gynecological examination.

Age-specific prevalence of sexually transmitted and reproductive tract infections in the population of sexually active women is shown in Table 4 . Trichomoniasis was most commonly diagnosed, with prevalence peaking in women over 30 years at 9.6% and for the sexually active adolescent (<17 years) at 11.1%. In all age groups older than 17, *C. trachomatis* infection was more common than *N. gonorrhea* infection, with chlamydia peaking at 10.5% in the 17-19 age group and gonorrhea in the 20-29 age group at 2.9%. Of women positive for any sexually transmitted disease, 10.3% had more than one, with chlamydia and trichomoniasis being the most common mixed infections. After the high percentages found among adolescents (19.8% in ≤17 year olds rising to 25.6% among 17 - 19 year olds), the prevalence of candidosis declined with increasing age. Syphilis was the only infection for which the incidence clearly increased with age. Chlamydia and/or gonococcal infection was associated with a mucopurulent endocervical discharge in only 4.1% of women; 95.9% of cases were symptom-free. Gonorrhea and/or chlamydia was detected in 7% of women with suspected pelvic inflammatory disease and 8.1% of those without.

Discussion

This study shows that sexually active adolescent girls in this rural area of southeast Nigeria are at risk in relation to several important aspects of reproductive health: 19.4% had a sexually transmitted disease, 40.4% a reproductive tract infection, and in at least 24.1% a pregnancy ending in

Table 4

Sexually Active Women (n=684) Examined with Reproductive Tract Infections by Age Group

Reproductive Tract Infection*	Adolescents (%)		Non-adolescents (%)	
	<17 yr (n=81)	17-19 yr (n=158)	20-29 yr (n=225)	≥30 yr† (n=190)
Gonorrhoea	1.3	1.9	2.9	0
Syphilis	2.7	2.6	3.1	6.0
Chlamydia	1.3	10.5	4.9	5.4
Trichomoniasis	11.1	8.3	6.2	9.6
Symptom-free candidosis	42.0	35.9	25.0	15.5
Candidosis with itching and discharge	19.8	25.6	8.6	3.7
Any sexually transmitted disease‡	16.2	20.9	15.5	20.1
Any reproductive tract infection§	33.3	43.8	22.9	23.4

* Swab results not known for 37-44 women.

† N Age not known for 1 woman.

‡ Because direct evidence of sexual transmission of candida is lacking, yeast infection is not classified as a sexually transmitted disease. Reproductive tract infection here includes gonorroea, syphilis, chlamydia, trichomoniasis, and candidosis.

§ Reproductive tract infection and/or symptomatic (ie with itching and vaginal discharge) yeast infection.

abortion. At the time of the survey, 42.1% of sexually active girls had experienced either an abortion or a sexually transmitted infection. Facilities for treatment were virtually non-existent.

Few previous studies have screened a large population of unmarried adolescents or compared morbidity between adolescents and non-adolescents from the same rural community. Studies to date have included few adolescents, especially unmarried girls, or have selected only married women. This partly reflects the difficulty of studying adolescents. The high attendance rate was due to intensive preparation and follow-up activities in a small community where one of the investigators lived.

One observation of importance for subsequent population studies of adolescents is that the real risk of sexually transmitted diseases may be easily underestimated in this group. In this study, because most women aged 20 years or over were sexually active, the population distribution is similar to that based on sexually active women alone. Among adolescents, however, the population prevalence of sexually transmitted diseases is influenced by the proportion who have become sexually active at different ages: e.g., 4.6% of adolescents under 17 had a trichomonal infection but among those sexually experienced, the prevalence was 11.1%. This is higher than in any other group, reflecting the fact that incidence of *T. vaginalis* peaks in the post-pubertal period following the onset of sexual activity. Comparison between adolescent populations also requires control for extent of sexual activity.

Abortion helps ascent of gonococcal and chlamydial infections to the upper genital tract, which may cause infertility or ectopic pregnancy. There was little evidence that infertility was a problem in K'Dere. Pelvic inflammatory disease was more common in older women and was not closely associated with chlamydial infection. This could indicate a relatively recent rise in sexually transmitted diseases among adolescents since, in older women, pelvic inflammation may result from puerperal sepsis, most women being delivered at home by untrained attendants. *C. trachomatis* was isolated from 10.5% of sexually active 17-19 year olds, compared with 1.3% in younger girls. In developed countries, chlamydia is found more frequently in younger women and a recent study in the US identified age as an independent predictor of chlamydial infection after control for behavioral characteristics. In Africa, some studies in pregnant and high-risk women have found rates of chlamydia that were lower than expected, given the high prevalence of other infections, which may indicate a relative immunity to *C. trachomatis* among women exposed at an early age. Studies which include only a small sample of 17-19 year olds are likely to miss the group most exposed to *C. trachomatis* and most at risk of long term sequelae.

The prevalence of vaginal discharge reported by adolescents is striking (82.4%). Symptomatic yeast infections could have contributed, but 95.9% of chlamydia and gonorrhea infections were symptomless. Women may confuse normal changes over the menstrual cycle with abnormal discharge, but other factors could be involved about which the authors have no information, such as anogenital hygiene and infection with bacterial vaginosis.

The results of this study demonstrate the need for special services for adolescents. Recent interest in integrating sexually transmitted disease clinics with family planning and maternal and child health services may work well for older women. Unmarried adolescents make little use of such facilities in developing countries, and even in some developed countries, the majority of teenage female patients at sexually transmitted disease clinics are not otherwise having medical care, nor practicing protective measures.

Commentary

The lack of existing studies on young, unmarried women demonstrates the difficulty in studying adolescent health problems. Brabin *et al.* provide a well-designed, cross- sectional study that examines the risk of young adolescent women for acquiring sexually transmitted diseases (STDs) and for seeking abortions to end unwanted pregnancies. That young maternal age itself is a direct risk factor for some STDs is physiologically possible given that the surface of the cervix of young women from post-menarche to several years thereafter is likely to be more susceptible to infection from gonorrhea or chlamydea, according to

textbooks. Does this article bear out this possible direct relationship of young age and STDs?

As can be seen in Table 4, gonorrhea rates of infection continue to increase with age. But with chlamydia, the age group 17-19 years appears especially vulnerable with nearly twice the prevalence of any other age group. Trichomoniasis and candidosis are particularly problematic for young women as compared to their older counterparts.

Is this increase in infection higher in young women due to age or behaviors? The answer to this is not investigated by the authors. What we do know is that about 80% of young women (17-19 years old) have had sexual intercourse compared with 98% of women 20-29 years old. Far fewer adolescents are married (less than half the level of those in their 20's), and only about 2.4% of adolescents have ever used a modern method of family planning compared to 14-26% for 20-29 year old women. Although fewer adolescents have ever been pregnant (nearly 40% versus 85-99% among 20-29 year olds), the rate of abortion among sexually active women in their 20s is only slightly higher than for sexually active adolescents. Taken together, this means that when an adolescent woman becomes pregnant she is more likely to seek an abortion. **Younger women's behaviors are clearly more risky than their older counterparts.**

Acquiring an STD at a young age is particularly problematic because it increases their risk of developing long term consequences such as pelvic inflammatory disease (PID) and infertility, and of experiencing poor pregnancy outcomes, such as ectopic pregnancy. Also, they are placed at a higher risk for acquiring HIV/AIDS, and for acquiring it at a very young age.

Although not discussed in this article, literature suggests that early sexual debut significantly increases the chance of HIV transmission. Also, there is a known association between cervical cancer and STD infections—particularly viral infections—thus increasing the chances of premature mortality in this age group.

What is very striking about the findings of this study is the lack of association between any complaint of vaginal discharge and actual cervical infection (gonorrhea and chlamydia). In addition, the level of asymptomatic infection is surprising. This poses an enormous challenge in determining how to provide specific, effective services to this vulnerable population.

Also striking is the very large unmet need for contraception in this young population. The fact that over 24% of sexually active adolescent women sought abortions underscores a need for improved access to services and for contraceptive choice. A comparison of the STD prevalence data and the abortion data might suggest a higher risk for septic abortions, which in turn could lead to increased mortality.

The results of this study make a strong statement for the need to provide sensitive health services to this population, and at every opportunity to provide education as well. Services should include access to appropriate treatment for STDs, counseling, and contraceptive options.

Box 2

The Narrative Research Method: Eva Meets John

Among current areas of investigation in adolescent reproductive health is the development of methods that are appropriate for the adolescent population. Since work with adolescents can involve sensitive issues, and the work itself is sometimes controversial, it is important to identify methods that do not stigmatize or alienate adolescents.

In order to address these needs, the World Health Organization Adolescent Health Programme (ADH) has developed and adopted a procedure called the Narrative Research Method, which draws upon the experience of young people, and is intended for use by young people themselves, although it can be applied by any group. This method makes use of role play in the initial planning stages, in order to develop a prototypical story line which is then taken into the field and modified by other young people and converted into a questionnaire about sexuality and reproductive health.

An example of the use of the narrative research method is provided by this case study from Africa, based on the following list of life events: 1) the first meeting between a boy and a girl; 2) parental reaction to the girl's deception about the meeting; 3) the second meeting; 4) the boy makes his first advance to the girl; 5) the girl and the boy begin a sexual relationship; 6) the girl fears she is pregnant; 7) parental reaction to their daughter's pregnancy; 8) the boy is infected with a sexually transmitted disease; 9) the girl gives advice to her younger sister who is beginning to meet boys.

The workshop participants in this case study began by creating two characters, a boy and a girl, in this case Eva and John. They then took turns role playing the situations on the list of adolescent life events, with observers to critique the scenes. Counter-examples were solicited from the audience in order to explore important variations in the scenario.

A questionnaire was designed based on this role playing material. The workshop discussions surrounding each role play produced several alternative stories for each life event, and these variations were then written into the questionnaire. As a result, a set of narrative options was listed. For example, the first few questions read as follows:

1. ***For their first meeting, Eva and John are most likely to***

   a) go to the marketplace and talk; b) go to the cinema; c) go to one of their homes and talk; d) go to a friend's house and talk; e) take a walk or sit by the river.

2. ***What do Eva and John talk about?***

   a) John tells Eva about his feelings toward her; b) Eva tells John about her feelings toward him; c) They both talk about their feelings toward each other; d) Neither talk about their feelings on this first meeting.

3. ***John wants Eva to stay longer with him, even though it is time for Eva to go home. What does Eva do?***

   a) She insists that she must be home by 5:30, as her mother instructed; b) She yields to John's wishes and goes home late.

Through these steps, the narrative research method builds a story and helps to identify, in a systematic way, the most common patterns of sexual behavior and relationships experienced by young people in their own societies, drawing upon the knowledge of young people themselves. The different perspectives of males and females, younger and older adolescents, rural and urban residents and those of different ethnic or socioeconomic classes can be analyzed, to the extent that the initial story developed is considered to be relevant to these subgroups and the sample selected is representative of them.

After the questionnaire is administered, the youth researchers review the primary findings in order to plan action based on what they have learned. This can be followed by in-depth statistical analysis to elaborate the results. Program planners and implementers then can use the information to inform development of their programs.

In addition to the narrative research method, other types of participatory research methods are popular for working with adolescents since they allow development of a story in much the same way. These include focus groups, peer groups, and drama.

Source: World Health Organization (WHO). August, 1993. The Narrative Research Method: Studying Behavior Patterns of Young People-by Young People: A Guide to its Use. Geneva: Adolescent Health Program, Division of Family Health, WHO.

Investing in the Future: Six Principles for Promoting the Nutritional Status of Adolescent Girls in Developing Countries.

Kurz, Kathleen, Nancy L. Peplinsky, and Charlotte Johnson-Welch. 1994. Washington, D.C.: International Center for Research on Women.

The International Center for Research on Women developed a framework for improving adolescents' nutrition, based on the results of a USAID funded research program. Under this program, ICRW conducted a survey of more than 100 programs working with adolescents in Africa, Asia, Latin America and the Caribbean, and also conducted a literature review on nutrition and adolescence. Taking a broad approach, six guiding principles for interventions to improve adolescent nutrition were determined. The six principles are:

1. ***Improve Adolescents' Food Intake***
2. ***Keep Girls in School to Promote Nutritional Status***
3. ***Postpone First Births to Enhance Nutritional Status***
4. ***Reduce Girls' Workloads and Improve Work Conditions***
5. ***Improve Adolescents' Health for Better Nutritional Status***
6. ***Enhance Girls' Self Esteem to Encourage Nutritional Status***

The interrelationship of these six principles can be seen in Figure 1. While all six principles are important, priority is given to those interventions that have proved most feasible and effective in maintaining or improving individual nutritional status and the numbers affected. The principles and the strategies to implement them are discussed below:

Principle 1—Improve Adolescents' Food Intake

The most obvious intervention to address nutritional deficiencies is to increase food intake. To achieve this goal, related strategies include:

- ✦ Increasing household purchasing power.
- ✦ Educating adolescents about nutrition.
- ✦ Offering meals at schools or worksites
- ✦ Offering iron fortification or supplementation
- ✦ Discouraging gender differences in food intake.

Principle 2—Keep Girls in School to Promote Nutritional Status

Many nutritional deficiencies, particularly in young women, cannot be solved by increased food intake alone. Evidence strongly supports the idea that girls' education is tied to their health status, and at younger ages school can provide a setting for regular and nutritious meals. Strategies to keep girls in school include:

- ✦ Ensure girls' safety and privacy at school.
- ✦ Establish schools close to home.
- ✦ Increase the proportion of female teachers.
- ✦ Make school hours more flexible.
- ✦ Offer an alternative to formal education.
- ✦ Integrate food supplementation into school systems

Principle 3—Postpone First Births to Enhance Nutritional Status

Early and frequent births have a major impact on the nutritional status of young women. Avoiding early births is important, and can be encouraged through practices that:

- ✦ Postpone age at marriage
- ✦ Offer appropriate family planning and reproductive health services for adolescents

- ✦ Provide family life education and life options
- ✦ Increase educational attainment for girls.

Principle 4—Reduce Girls' Workloads and Improve Work Conditions

Since many girls must work at young ages to support themselves and their families, work-related intervention strategies appear to hold promise. Possible strategies are:

- ✦ Introduce mechanisms to reduce girls' workloads
- ✦ Teach adolescents income-earning skills
- ✦ Build partnerships with employers

Principle 5—Improve Adolescents' Health for Better Nutritional Status

Good health status overall can enhance nutritional status. Strategies to improve health include:

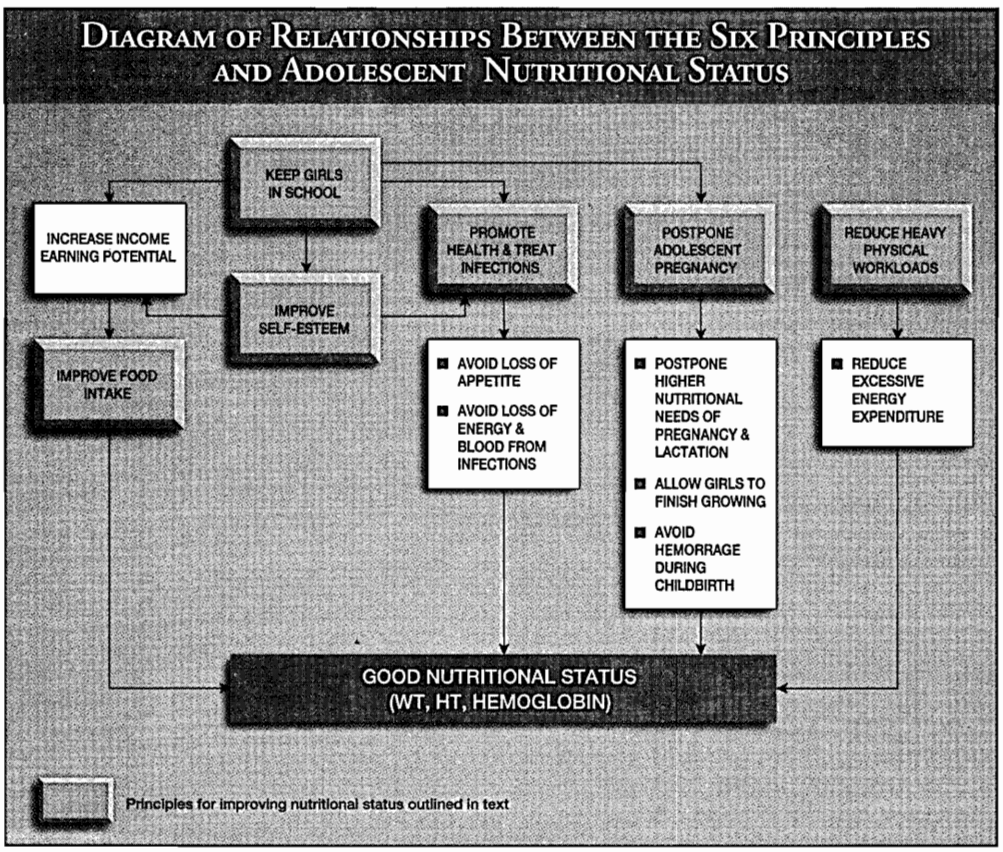
- ✦ Inform and educate adolescents about their health
- ✦ Design and provide health services for adolescents
- ✦ Develop effective communication strategies for adolescents

Principle 6—Enhance Girls' Self-Esteem to Encourage Nutritional Status

Broad programs aimed at improving the status of girls will help to enhance self esteem. In turn, these programs should contribute indirectly to the improvement of nutritional and overall health status. Such programs includes strategies that aim to:

- ✦ Increase knowledge and skills
- ✦ Provide opportunities for achievement
- ✦ Increase girls' awareness of opportunities for the future
- ✦ Establish means for communication

Figure 1



Source: Kurz, Peplinsky & Johnson-Welch (1994)

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MotherCare™ Matters

A QUARTERLY NEWSLETTER AND LITERATURE REVIEW ON MATERNAL AND NEONATAL HEALTH AND NUTRITION

IMPROVING OBSTETRICAL AND NEONATAL MANAGEMENT: LESSONS FROM GUATEMALA

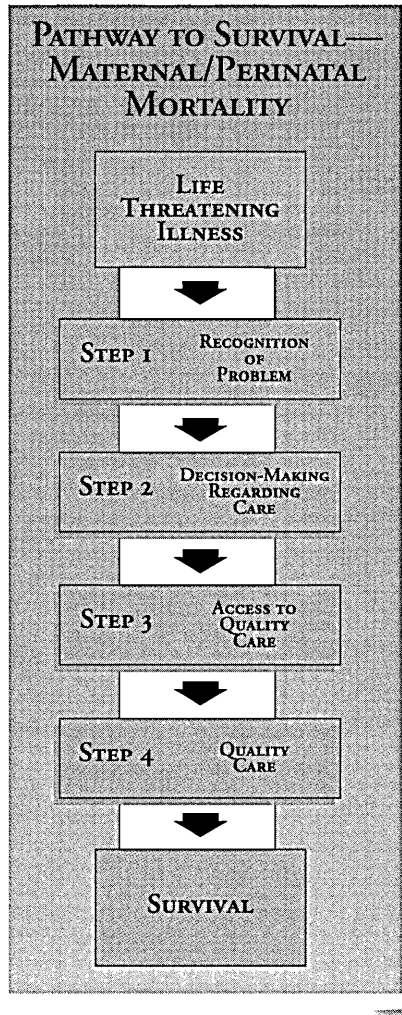
Section 1—Hospital Training and Its Effect
Section 2—Community Involvement

Introduction

With this issue of ***MotherCare Matters,*** we continue with our review of MotherCare's projects during the first phase of the project, 1989-1993. (See *MotherCare Matters, Volume 5, No. I,* for the demonstration projects in Indonesia.) The demonstration projects implemented during MotherCare I focused on the design and testing of interventions to reduce maternal and perinatal mortality and related morbidities. These interventions address the steps on the Pathway to Survival for women and newborns, outlined on the right.

Beginning at the point where an obstetrical or newborn complication occurs, there are four major steps that require attention in order to promote the survival of a woman or her baby. Step 1 is recognition of the life threatening complication by the woman, her family, traditional birth attendant (TBA) or other provider in attendance who cannot manage the complication. Step 2 is the decision to seek care, typically made by family members other than the woman if she is in poor condition. Once the problem is recognized, impediments to accessing services must be overcome, such as distance, lack of or cost of transport, geographical or weather constraints, perceived poor quality or attitude of the providers (Step 3). These same problems also weigh heavily on the decision to seek care (Step 2). The last step is the quality of care available and provided once services are accessed. Death of a woman, fetus or newborn is more likely to ensue if one of these steps is not taken.

To explore the steps in the Pathway to Survival in depth, this issue of ***MotherCare Matters*** reviews the interventions and results from the Quetzaltenango Maternal and Neonatal Health Project. This project was implemented in Guatemala under the direction of Dr. Barbara Schieber and her staff of the *Instituto de Nutrición de Centroamerica y Panamá (INCAP).*



Guatemala has the third highest maternal and infant mortality

in the Western hemisphere after Haiti and Bolivia. The maternal mortality ratio for Guatemala is estimated at 200 per 100,000 live births and the infant mortality rate at 51 per 1000 live births, with higher rates in the rural highlands (WHO and UNICEF, 1996; DHS Preliminary Report, 1995). At least 31% of all infant deaths occur within the neonatal period (OPS, 1986). Recent community-based data from the Quetzaltenango Health Area show a perinatal mortality rate of 23.2 per 1000 total births and a neonatal mortality rate of 16.7 per 1000 live births (WHO, 1996; Schieber and Szasdi, 1994).

The TBA is the primary provider of maternity care for Guatemalan women. The majority of Guatemalan women give birth at home with the TBA in attendance. An estimated 20,000 TBAs attend 60-70% of all births; this percentage rises to over 90% in the rural areas.

Guatemala has the institutional capacity to provide formal medical services to approximately 20% of all women giving birth. Obstetric expertise does not exist outside the hospitals although prenatal and child care are offered by nurses and nurse auxiliaries at health posts and health centers. Midwifery was abolished in Guatemala twenty years ago. There are few outreach MCH or midwifery services from the health posts or health centers into the community and thus there is no exchange between formal health care institutions and the TBA. Women prefer to avoid the hospital as they feel that their needs, including such issues as respect, proper attention, and considerations of language barriers, are not met there. This leaves the bulk of maternity care in the hands of the TBA.

The Quetzaltenango Maternal and Neonatal Health Project was developed by INCAP with MotherCare to improve obstetrical and neonatal services and ultimately to impact on maternal and neonatal outcomes. Objectives of the project and their relationship to the four steps of the Pathway to Survival were as shown below.

In addition, an objective was set to measure the process of project implementation and of the effectiveness of project activities on maternal and neonatal outcomes.

To this end, a treatment and control area with a population of approximately 165,000 was selected in the health zone of Quetzaltenango for the study, and protocols for recognition and referral or management of complications were developed and implemented. A sensitization campaign was implemented among health providers to foster good working relations between them, including with the TBAs. Changes were made in the hospital with respect to temperature control in the nursery, cot nursing, guidelines for clothing sick neonates and infection control. A medical audit of neonatal management was carried out retro-

Objectives	Pathway to Survival steps addressed
• **to improve TBAs' ability to recognize obstetrical and neonatal complications and respond to them through a 3-day training**	**Steps 1 and 2—** Recognition of Complications and Decision Making
• **to improve relationships between hospital personnel and TBAs and the women they refer**	**Steps 1, 2 and 3—** Recognition, Decision Making, Logistics
• **to supervise health post and health center staff by project personnel**	**Step 4—** Quality of Care
• **to develop norms and protocols for the detection and management of maternal and newborn complications at health posts, health centers and the referral hospital**	**Step 4—** Quality of Care
• **to improve the detection, management or referral of complications at the health post, health center and hospital levels through orientation of staff to the norms and protocols**	**Step 4—** Quality of Care

spectively to measure the impact of all these changes. 400 TBAs were trained in timely recognition and referral of maternal and newborn complications including bleeding, swelling of hands and face during pregnancy, malpresentation, prolonged labor, retained placenta, depressed newborn breathing, postpartum bleeding and maternal and neonatal infections.

The Quetzaltenango Maternal and Neonatal Health Project was initiated in July of 1990 and continued through August of 1993, during which there were 4031 births monitored through 6 monthly community surveys.

This issue of ***MotherCare Matters*** specifically looks at the Quetzaltenango results to address step 4 of the Pathway to Survival on Quality of Care; and steps 1, 2 and 3 of the Pathway which taken together address "access" to care, by asking the questions:

- **Do improvements in the quality of care at the referral facility improve outcomes of pregnancy?**
- **Does TBA training help to increase detection and referral of women and newborns with complications to the improved facility?**

This issue also continues a commitment to presenting overviews of the results of our various field projects to our readers. We share these findings and experiences of our work to you in hopes that the lessons learned provide information useful for others working in maternal health endeavors around the world.

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Director, MotherCare

Our appreciation extends to Deborah Gordis, a consultant to MotherCare, who abstracted the three articles on the Guatemalan project.

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SECTION ONE

HOSPITAL TRAINING AND ITS EFFECT

The Effect of Hospital Staff Training on Management of Obstetrical Patients Referred by Traditional Birth Attendants.

K. O'Rourke. 1995. International Journal of Gynecology and Obstetrics 48 Suppl. S95-S102.

One component of the Quetzaltenango Maternal and Neonatal Health Project was the training of hospital staff at the *Hospital General de Occidente San Juan de Dios,* the primary referral hospital for obstetrical patients in the Quetzaltenango health area.

As approximately 80% of women in this area of Guatemala deliver at home with a traditional birth attendant (TBA), referral hospital staff are better able to manage obstetrical/newborn complications if a TBA's referral occurs in a timely manner. Delays by TBAs in referring patients as soon as a complication is identified can result in decreased ability of the hospital staff to provide health care with good outcomes. Furthermore, if patients admitted to the hospital do not have good outcomes, the TBAs' decision not to refer patients may be reinforced.

A pre-intervention survey (Schieber and Delgado, 1993) conducted in the project area determined that many women preferred not to be cared for in the referral hospital. The primary reasons given were that people die there; women will be operated on or sterilized; there is often a language barrier; and patients experience maltreatment. In another survey (Schieber and Delgado, 1993) also conducted prior to the implementation of the hospital training program, the majority of TBAs indicated that their patients had not received adequate support from the hospital staff.

The efficacious management of TBA-referred patients with complications can have a significant impact on the number of referrals as well as perinatal outcomes. MotherCare supported a study to examine the impact of a hospital staff training program on women referred to the hospital by TBAs.

Methodology

From March 1991 to November 1991, hospital staff were instructed for forty hours in standards of care for managing obstetrical and neonatal patients. Standards of care developed by specialists within the hospital with technical assistance emphasized clinical assessment of problems and proper treatment of maternal and neonatal complications. Medical chiefs, residents and nurses were instructed in the utilization of these protocols.

Hospital staff were also instructed in the importance of being supportive and understanding of TBAs and mothers referred by TBAs. First, health care personnel were taught about TBA practices and how they contributed to patient well-being. Secondly, TBAs were encouraged to visit the referral hospital and attend the deliveries of their patients. Posters were placed in hospital rooms to remind staff of the importance of treating TBAs and their patients with respect.

Training of TBAs to recognize complications and the need to immediately refer women or newborns with complications took place between March and May 1992. Data were collected by trained physicians on all TBA referred women from September 1990 through May 1993. Information was obtained through medical record review and the administration of questionnaires to the referred women during their hospital stay. A total of 844 women participated, including 705 women who were transferred to the hospital prior to delivery as well as 139 women who gave birth to their

infants at home and were subsequently transferred to the hospital for postpartum complications. Data were collected pre-training, during training and post-training of hospital staff in the protocols. A cross-sectional study design was followed comparing pre- and post-training data.

Results

Although absolute numbers were small (average of 6 referrals per month prior to hospital training), there was a >200% increase in the mean number of referrals from pre- to post-hospital training (average of 23 referrals per month post-hospital training). Statistical analysis of the data found that characteristics of women referred to the hospital did not vary significantly throughout the study. In general, there was an increase in the numbers of women >30 years as well as for those with >5 pregnancies. However, with the exception of a statistically significant decrease in the percent of women with referrals for retained placenta, there was no change in the types of complications for which women were referred.

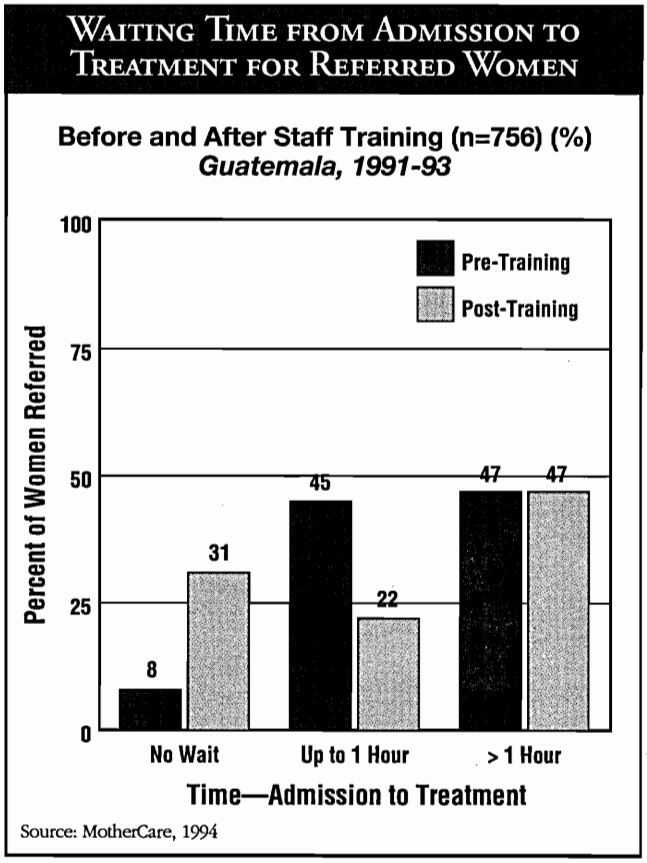
A regression analysis was performed evaluating both the effect of hospital and TBA training on the number of referrals. Results indicated a significant increase in the number of referrals following hospital training with no differences for women referred by trained or untrained TBAs. Thus, the most probable explanation of the increase in referrals was the hospital staff training program.

The effect of the hospital training program on patient satisfaction was measured by asking patients if they would return to the hospital another time. In pre-training, 79% of referred women indicated they would return; in post-training this figure grew to 94%. Infant mortality was a significant determinant of patient satisfaction with 94% of women with a live birth stating they would return as compared to 87% of women with an infant death.

The time between admission to the hospital and treatment decreased significantly throughout the training period. An analysis of changes in waiting time from pre- to post-training for specific complications revealed significant diminutions in waiting time for women with retained placenta, postpartum hemorrhage and women for whom no complication could be identified. (See Figure 1).

The only obstetrical treatment to change significantly following the hospital training program was the increase in use of oxytocins, when all referred women with recorded data were compared. To clarify changes in cesarian sections and oxytocin usage, analyses were repeated on a subset of women with prolonged labor who were more likely to need these treatments. Use of both treatments increased slightly but the values were not statistically significant due to small numbers.

Figure 1



With respect to perinatal outcomes, perinatal mortality decreased from before to after the hospital training program. However, this change was not statistically significant. (See Table 1). After excluding 11 miscarriages, 37 inevitable deaths and 139 births which occurred in homes of referred women, there

Table 1

Percent of Perinatal Mortality for Infants of Referred Women from Pre- to Post-Training (N=595)		
Study Period	**Die *n* (%)**	**Live *n* (%)**
Pre-training	10 (20.41)	39 (79.59)
Post-training	18 (14.84)	465 (85.16)

Chi-square = 1.078, 1 d.f., P = .299
Source: Adapted from O'Rourke, K. 1995

were 10 perinatal deaths of 49 births prior to hospital training (20%) as compared with 81 over 546 births (15%) after training. The most common diagnoses associated with mortality were malpresentation, prolonged labor, maternal exhaustion and preterm labor. These diagnoses were not mutually exclusive and 16 of 24 women who had prolonged labor also had an infant with malpresentation. One possible reason for lack of statistical significance is the condition of the fetus and/or mother prior to hospital admittance. Maternal deaths were too few to test significance. One- and five-minute Apgar scores also improved slightly but improvement was not statistically significant.

A multivariate analysis was conducted controlling for timing of referrals by TBAs (as stated by the mother) as well as whether a mother was cared for by a trained or untrained TBA. Late referrals by TBAs resulted in significantly increased perinatal mortality; whether or not TBAs were trained was not a significant factor.

Conclusions

The most striking result in the hospital training evaluation was a dramatic increase in the overall numbers of referrals. Since the overall birth rate for Quetzaltenango increased 3% per year, it would be extremely unlikely for the referral increase to be due solely to increased numbers of deliveries. Since the percent of increase was similar for both communities in which TBAs were trained and those that were not, it is not likely that this increase resulted from TBA training.

Long waits at the hospital were identified before the training as a reason for refusing referral. Data on the waiting period may have been subject to recall bias as they were determined by comparing the difference between the time a patient indicated she arrived at the hospital and the time of treatment by hospital staff. After the training program, more women were seen immediately upon admission, but this change only affected the proportion of women who waited up to one hour. These were women for whom treatment must be rendered immediately - women complicated with postpartum hemorrhage or retained placenta. Both before and after training, approximately 40% of women waited over one hour for treatment.

The fact that infant mortality was lower for women who waited > 1 h for treatment provided some evidence that even prior to the training program hospital staff were prioritizing patients according to their medical urgency. The finding that, following hospital training, the percent of women seen immediately increased, while the percent who waited up to 60 minutes decreased —the time period with the highest infant mortality—illustrated that improvement occurred where it was most needed. While perinatal mortality rates remained similar for women who waited < 1 h, there were fewer women in this category.

Women who waited < 1 h for treatment were the least likely to state they would return to the hospital in the future. It is possible that these women had more serious complications and felt that they should have been seen immediately. In contrast, women who waited > 1 h for treatment were more likely to state that they would return in the future. This finding suggests that women may be more willing to wait

for treatment if they feel their situation is of lower medical urgency.

Analysis of mortality from pre- to post-training identified a decrease in perinatal mortality but this change was not statistically significant. This lack of significance does not mean that the program was ineffective, in terms of improving quality of care, but it may reflect the multi-causative factors which affect both Apgar scores and perinatal mortality, including many which happen prior to coming to the hospital.

Training of hospital staff can positively affect patients referred to the hospital by TBAs. Improved patient satisfaction and changes in patient care, e.g. a decreased waiting period, provided an atmosphere in which TBAs were more willing to refer patients to the hospital and patients were more willing to accept referrals. These changes in hospital staff attitudes were more likely due to the efforts aimed at strengthening the staff's positive attitude toward TBAs and toward the culture of birthing in their area than to the treatment protocols. However, all the hospital training probably raised awareness that improvements in care were not only necessary but also achievable.

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Medical Audit of Early Neonatal Deaths—INCAP/Quetzaltenango Maternal and Neonatal Health Project.

Barbara A. Schieber, MD, Mario Mejia, MD, Sara Koritz, MD, Carlos Gonsalez, MD with Barbara E. Kwast, MTD, MPH, Ph.D. January 1995. MotherCare Technical Working Paper #1.

The underreporting of perinatal/neonatal deaths is a serious problem throughout the developing world. Vital registration systems for documenting these events are inadequate in many countries, particularly where definitions are unclear and a stillbirth may be socially stigmatizing for the mother. Furthermore, in many countries a newborn is not recognized until it survives a period of time from one week up to 40 days when traditional naming ceremonies may take place.

Perinatal and neonatal mortality decline slowly in comparison with infant and child mortality because they are less sensitive to the effects of socioeconomic development or child survival programs. They require targeted prevention strategies including the early diagnosis and treatment of specific medical conditions in the prenatal period and the improvement of labor and delivery management and early newborn/neonatal care. Community-based data from the Quetzaltenango Health Area at the time of the Maternal and Neonatal Health Project (1989-1993) show a perinatal mortality rate of 23.2/1000 total births and a neonatal mortality rate of 16.7/1000 live births (Schieber and Szaszdi, 1994).

The Intervention Area

The Hospital General San Juan de Dios in Quetzaltenango delivers about 3000 babies a year. Before the start of the Maternal and Neonatal Health Project, sanitary conditions were poor, rooms were overcrowded and premature infants were doubled up in incubators. Babies delivered by cesarian section were transported along open corridors from the operating room to the nursery. Resuscitation equipment was suboptimal. The breastfeeding policy was not fully supported. Diagnostic hospital studies carried out prior to the project showed that 96% of perinatal mortality was due to asphyxia secondary to malpresentation and

prolonged labor; neonatal sepsis; and complications associated with prematurity and low birth weight.

With the arrival of a specialist neonatologist on staff in 1990, the project developed norms and protocols for the management of obstetrical and neonatal conditions and oriented hospital personnel in the use of these norms in a two day session.

Infrastructural improvements were made in temperature control in the nursery, infection control, and breastfeeding support. Rooming in was also instituted. Specialized training was given in management of neonatal asphyxia. Quality assurance guidelines were instituted to monitor compliance with norms and protocols, and statistics on mortality and morbidity were collected to measure the efficiency of the protocol changes and neonatal health outcomes. In order to assess improvement in management after the training of hospital personnel, a medical audit of case management through record review was conducted.

Study Design

The sample was drawn from early neonatal deaths (from one to seven days) taking place at the hospital in 1989, 1991 and 1992; one year pre-intervention and two years following hospital training (which occurred from March through November of 1991). Thirty cases were selected for each year by random number. A total of 85 deaths were reviewed. The following cases were excluded:

- ✦ stillbirths;
- ✦ late neonatal deaths from 7-28 days (these preclude evaluation of obstetric management);
- ✦ neonates *not* delivered in hospital;
- ✦ neonates with congenital abnormalities which are incompatible with life;
- ✦ neonates weighing less than 1500 grams;
- ✦ and neonates born before 28 weeks gestation.

The design of the audit form for the record review was based on the British perinatal audit (Northern Regional Health Authority, 1992) and the confidential enquiry of maternal deaths in Ethiopia (Kwast et al., 1989). Management was designated as 'correct' or 'incorrect' according to the agreement between the protocols and actual management as indicated in the case notes. Investigators sought to determine "avoidable factors" in obstetric and pediatric management and availability of equipment and drugs. "Avoidable factors" were assigned according to a realistic assessment of what would be below acceptable standards of care or availability of equipment and drugs in the hospital. Avoidable factors were allocated to:

- ✦ patient/home circumstances;
- ✦ referral by TBA or others;
- ✦ service factors due to management by obstetric/pediatric/nursing staff
- ✦ lack of equipment, facilities and medications.

The analysis was done manually by a consultant obstetrician gynecologist for obstetric management and a neonatologist for pediatric management. No autopsies were performed.

Results

The hospital neonatal mortality rate (1-28 days) decreased from 38.3 in 1989, prior to hospital training, to 25.9 in 1991. There was a significant decrease in early neonatal mortality (1-7 days) from 32.9/1000 live births to 23.6/1000 live births. Separating early neonatal deaths into those occuring less than 24 hours versus between 1 and 7 days showed a significant reduction in deaths days 1-7 (16.5 to 12.8). However, the reduction in deaths less than 24 hours from 16.5 to 10.8 was striking but not statistically significant. In the year 1992, there was an increase in deaths by all age groups. While rates continued to be lower in 1992 than those in 1989, no significant changes were seen.

The major causes of all neonatal deaths were asphyxia, sepsis and hyaline membrane disease (usually associated with prematurity). Classified as "other" were various causes such as pulmonary hemorrhage, intracranial hemorrhage, and congenital abnormalities). (See Tables 2 and 3).

Table 2

Neonatal Mortality for Asphyxia, Sepsis, and Other Causes from 1989 –1992*				
Year	Total Live Births	Asphyxia	Sepsis	Other Causes
1989	2796	35[a] (12.5)	38[b] (13.6)	34[c] (12.2)
1990	3035	28 (9.2)	29 (9.6)	18 (5.9)
1991	3047	34[a] (11.2)	27[b] (8.9)	18[c] (5.9)
1992	3348	40 (11.9)	31 (9.3)	36 (10.8)

[a]: difference between 1989 and 1991: $X^2 = 0.23$; $p = 0.634$
[b]: difference between 1989 and 1991: $X^2 = 2.90$; $p = 0.089$
[c]: difference between 1989 and 1991: $X^2 = 6.35$; $p = 0.012$

* neonatal mortality rate in parentheses

Table 3

Early Neonatal Deaths Investigated Medical Audit by Cause (1989, 1991, 1992)				
Cause of Death	1989	1991	1992	Total
Asphyxia	8	11	12	31
Sepsis	7	4	6	17
Hyaline Membrane Disease	13	10	8	31
Other	2	4	0	6
ALL CASES	30	29	26	85

Table 4

Neonatal Mortality Rate for Weight Alone, Asphyxia and Sepsis by Weight from 1989 - 1992				
Variable	1989	1990	1991	1992
Weight Alone				
< 2500 Gr	25.7	18.5	19.0	22.0
≥ 2500 Gr.	12.6	5.93	5.9	12.24
Asphyxia /Weight				
< 2500 Gr.	8.5	5.27	4.59	8.06
≥ 2500 Gr.	3.25	2.63	2.95	2.96
Sepsis/Weight				
< 2500 Gr	7.8	7.3	6.8	6.2
≥ 2500 Gr.	5.7	2.3	1.9	2.9

Mortality by cause of death showed distinctions between birth weights. The neonatal mortality rate due to asphyxia decreased marginally while there was a greater reduction in death due to sepsis. When these changes are further analyzed by weight, the greatest reduction in neonatal mortality is among those babies weighing ≥2500 grams from 12.6 in 1989 to 5.9 in 1991 (though there was some improvement in babies weighing less than 2500 g). The greatest decrease was in deaths due to sepsis among babies weighing ≥2500g. (See Table 4).

The 85 deaths reviewed included 31 asphyxia deaths, 17 due to sepsis, and 31 to hyaline membrane disease, and 6 "other." (See Table 3). Age at death did not vary much between the three years. In a review of deaths on any day, 49 (57.6%) were preterm with a gestational age ≥28-37 weeks. Among the preterm infants, 37/49 (75%) were <2500g. The predominant cause of death was from hyaline membrane disease (30/49), followed by sepsis (10) and asphyxia (9). Among the term babies, 75% weighed ≥2500g and the majority died from asphyxia (22/36). Over half of the deaths in each year occurred within 24 hours of birth. Most of these are first day deaths which are due to asphyxia and hyaline membrane disease, whereas the majority of deaths from sepsis took place after 24 hours.

Further analysis was conducted on the data for the three major causes of death and "other" causes to investigate differences in prenatal care, complications of pregnancy and labor, mode of delivery, Apgar scores, management and avoidable factors.

The majority of women (approximately 65 - 80% for each cause of death) had received no prenatal care. On average, 70% of women who lost an infant had pregnancy complications as compared to only 42% of women who lost a baby to asphyxia. (This may be due in part to the fact that the majority of asphyxia deaths were term babies; thus, preterm labor was not a possible pregnancy complication). It is difficult to draw connections between pregnancy complications and cause of death. However, there were more cases of preterm labor and preeclampsia among women who lost a baby due to hyaline membrane disease. Among the sepsis cases, there were more women with preterm prelabor rupture of membranes and among asphyxia cases there were more women with prolonged labor and breech presentation.

The average cesarian section rate was 39% for all causes of death. Approximately 12% of babies who died from asphyxia and sepsis had a vaginal breech birth. Babies who died from hyaline membrane disease and "other" causes had no breech births.

Approximately 51% of newborns had an Apgar score of 0-3 at birth. Of babies who died of asphyxia, 93.5% had an Apgar of 0-3. (The fact that most of these babies were born at term suggests intrapartum problems.) Furthermore, 51% of these babies still had an Apgar of 0-3 at 5 minutes. The recovery rate of babies with 0-3 Apgars who died from other causes was better; 80% had an Apgar of >4 at 5 minutes.

Ninety percent of babies that died from hyaline membrane disease were preterm with a weight

between 1500-2499g. This proportion was 38%, 52% and 17% for deaths from asphyxia, sepsis and other causes respectively.

Given that the majority of women had received no prenatal care, a reasonable assessment of management of pregnancy complications could not be made. Management of labor complications once the woman was at the hospital was found to be correct, according to the protocols for the most part, and this did not vary throughout the course of the study. Several women stated they were referred late by the TBA.

Resuscitation at birth was mostly correctly managed throughout the course of the study. Thermal control at birth could not be assessed. Subsequent management, ventilation and thermal control were mostly correctly managed. In 1989, there was a serious shortage of oxygen and for that reason medication is categorized as incorrect. However, despite the shortage of oxygen, ventilation was not labeled as incorrectly managed. An improvement in infection control was seen between 1989 and 1991. Breastfeeding could not be assessed because there was no information on this parameter.

Avoidable factors were assigned for substandard care allowing for what could be reasonably expected. During all three years (1989, 1991, 1992), the patient was assigned the majority of prenatal avoidable factors because a factor was assigned for no prenatal care or for delay in labor at home before coming to the hospital. The TBA or other health personnel could be assigned an avoidable factor if there was a delay in referral, mostly during labor. Obstetricians and pediatricians (private practice or hospital) were assigned an avoidable factor if diagnosis was delayed or management was incorrect. Shortage of antibiotics or oxygen earned an avoidable factor under "drugs." Lack of ventilators or nonavailability of the operating room earned avoidable factors assigned under "equipment."

A percentage of avoidable factors was calculated from total possible scores. The total possible score for each period of activity was multiplied by the total number of patients in that year and divided by the actual score. The total number of avoidable factors possible per patient for the prenatal period was 6; for labor and delivery, 6; for the newborn 8. The percent avoidable fac-

Table 5

Percentage of Avoidable Factors by Pregnancy and Neonatal Period 1989, 1991, 1992 (n = 85)

Year/ Avoidable Factors	Prenatal[1]			Labor[2]			Neonate[3]		
	Total	Actual	Percent	Total	Actual	Percent	Total	Actual	Percent
1989 (n = 30) Avoidable Factors	180	26	14.4	180	22	12.2	240	37	15.4
1991 (n = 29) Avoidable Factors	174	25	14.4	174	28	16.1	228[4]	22	9.6
1992 (n = 26) Avoidable Factors	156	23	14.7	156	23	14.7	200[5]	79	39.5

[1] Total possible avoidable prenatal factors per woman = 6

[2] Total possible avoidable labor factors per woman = 6

[3] Total possible avoidable neonatal factors per woman = 8 (4 for management at birth; 4 for subsequent management)

[4] Total score does not add to 232 because 4 points are subtracted for 1 neonate who died before subsequent management

[5] Total score does not add to 208 because 8 points are subtracted for 2 neonates who died before subsequent management

tors for the prenatal period remained constant for three years at 14%. The percentage for labor and delivery fluctuated between 12% and 16%. There was a substantial drop in avoidable factors for the neonate, from 15.4% to 9.4% between 1989 and 1991. This percent rose dramatically to 39.5% in 1992 primarily due to a shortage of oxygen. (See Table 5).

Conclusions

The reduction of neonatal mortality from 38.3 in 1989 to 25.9 in 1991 indicates that the reorganization of neonatal services with the arrival of a neonatologist and the revision of standards of obstetric and neonatal care had an effect. Note that the year 1992 saw an increase in deaths primarily associated with the lack of oxygen supply. The greatest impact seen was on neonatal mortality after 24 hours for term babies, and this was associated with improved management of sepsis.

The audit showed that over 50% of deaths took place within the first 24 hours of life from 1989-1992 and were mainly due to asphyxia and hyaline membrane disease, which is associated with prematurity. These results are in accord with an earlier study in a Guatemalan community (Bartlett and de Bocaletti, 1991).

In spite of intensive training in resuscitation, the low Apgar scores at birth (0-3) of those babies who died from asphyxia hardly improved at 5 minutes. Of special concern is that the majority of these babies were at term. This highlights the need for improvement of labor management, both at the community and at hospital levels. Even though the TBA has been targeted for intensive training on recognition of complications, an effort should be made to educate women and their families as well to recognize, in particular, prolonged labor early on and to go to the hospital quickly. Hospital obstetric management cannot have much of an impact on intrapartum asphyxia which exists prior to admission. Almost 50% of women needed a cesarean section, the majority as a result of prolonged labor and fetal distress.

Many women had prenatal complications which were not identified because these women had not had prenatal care. Three or four prenatal contacts during a pregnancy would provide an opportunity for women to hear about and learn to recognize danger signs for which help should be sought in a more timely manner.

Finally, an ongoing medical audit, conducted in a supportive and cooperative atmosphere, can be an effective tool for improving obstetric and neonatal management. However, inclusion of a case fatality rate in assessments of quality of care and the measurement of changes over time is recommended to give a better understanding of the dynamics in the hospital setting.

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Analysis of the Vital Events Reporting System of the Maternal and Neonatal Health Project, Quetzaltenango, Guatemala

Patricia Elizabeth Bailey, DrPh, José Antonio Szászdi, MD, and Barbara Schieber, MD. December 1994. MotherCare Technical Working Paper #3.

The Quetzaltenango Maternal and Neonatal Health Project trained traditional birth attendant (TBA) trainers in order to improve their technical knowledge and to develop their training skills. The actual training of over 400 TBAs, conducted between March and May 1992 in three-day sessions, focused on the detection and timely, adequate management of obstetric and neonatal complications. Emphasis was placed upon the detection, management and timely referral of the complicated obstetric and neonatal cases that presented the greatest risk of mortality. Harmful practices such as the abuse of oxytocin injections and the use of alcoholic beverages during labor were also discouraged.

As stated in the previous abstracts, the project also developed norms and protocols for the management of maternal and neonatal complications at the health center and at the hospital. Medical and paramedical staff at the hospital were trained in the application of the protocols. The standardization of care of complications was given a high priority and to that end an effort was made to strengthen a referral system encompassing TBAs in the community, personnel at the district level health facilities and medical personnel at the hospital. Included in the intervention was an effort to foster good working relationships between the different levels of health care providers and the humane treatment of both women and TBAs. Meetings were held at all levels to sensitize providers to the need to respect the TBAs and the important part they play in the referral system. Posters placed in all health facilities reminded providers that everyone in the community is trying to save the lives of women and newborns.

Study Design

To evaluate the impact of the TBA training, The Vital Events Reporting System (VERS) was designed. The VERS utilized stratification and cluster sampling in both an intervention and a control area. Strata were selected based on distance from the closest hospital, the *Hospital General de Occidente San Juan de Dios* described in the previous two abstracts in this issue, and size of population. The final inter-

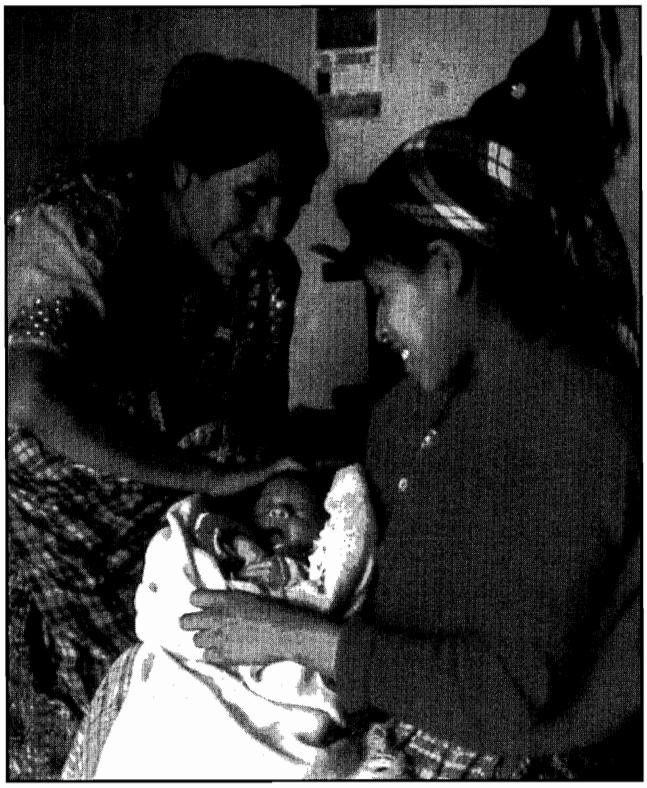
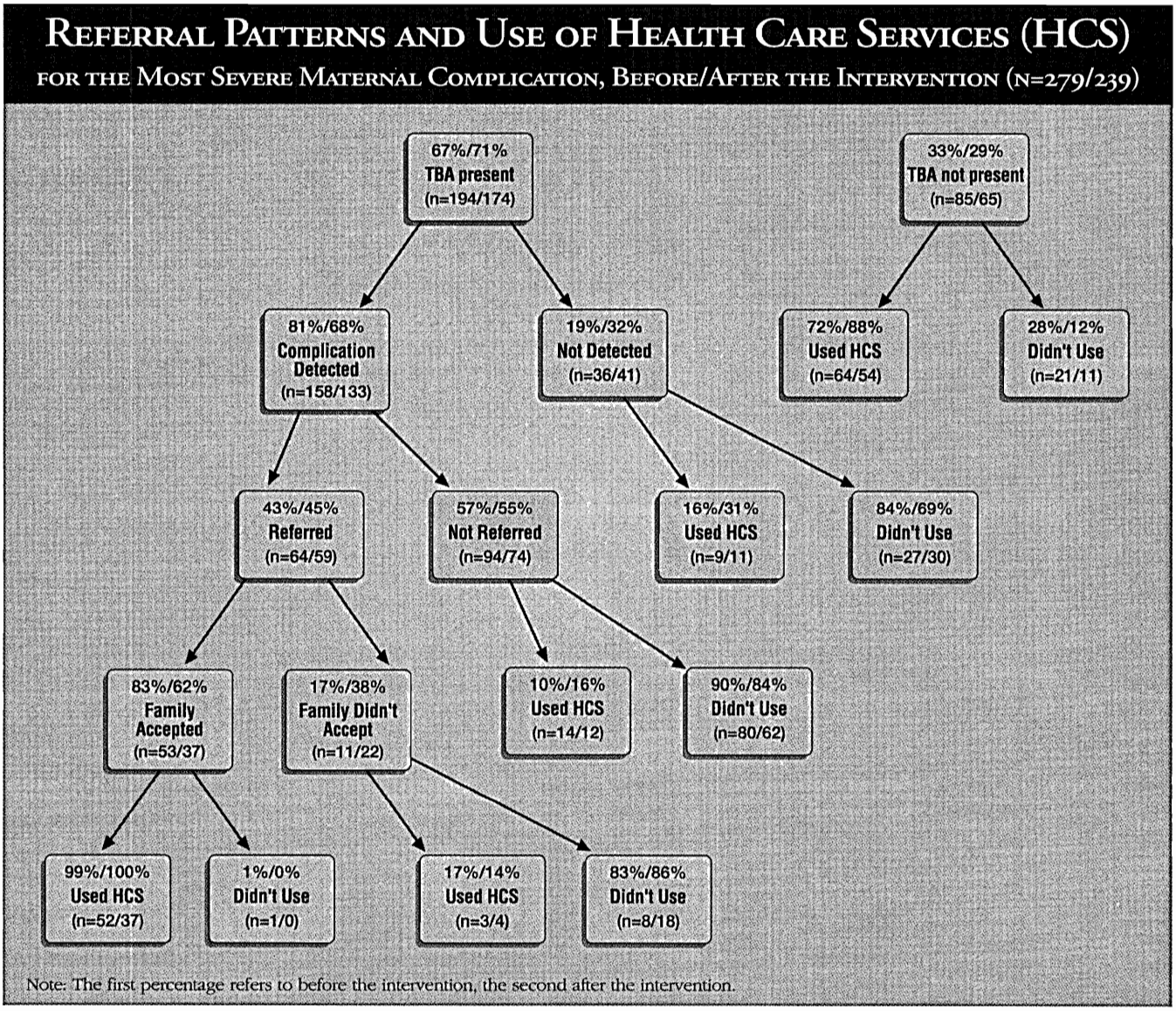


Figure 2



vention area consisted of 10 municipalities of the department of Quetzaltenango; the control area consisted of five municipalities of Quetzaltenango and four in the department of San Marcos. Total population of both the intervention and control areas was 165,000.

Data Collection

Data collection was based on a census of all births (n=4031) including both members of twin sets that occurred in the treatment and control areas during a period of almost three years (July 1990 through May 1993). Interviews were conducted by physicians with 1791 mothers: 836 who reported a complication associated with pregnancy, delivery, the postpartum period or her newborn and 955 mothers of normal births (approximately 35% of all normal births). The additional 2,240 normal births were added to the database in order to calculate the complication incidence rates. Information was gathered on a three-page questionnaire. Data were collected from sample mothers for each birth that occurred during four time periods.

Analysis

For this analysis, women are the focus, specifically women with complications and how they were managed. Questions asked included whether the TBA was present at the time of the complication, and if so, did she refer the woman? Was the referral accepted, and did she use health services? (See Figure 2 for pre-post results). Note that there was no significant difference in the results between the intervention and control areas in terms of management of complications. Hence, the analysis lumped the areas and focused on pre- and post-intervention results.

To study the management of complications, the most life-threatening problems reported by the woman for each phase (pregnancy, labor and delivery, and the post-partum phase) was followed. Given that women may have reported more than one complication, a hierarchy of complications was created. Because a woman may have reported several problems during a phase, a "double' hierarchy was created: a composite of antenatal, intrapartum and post-partum problems, where, for example, if a woman reported a complication in both delivery and postpartum period, the more life-threatening complication and its management is examined. (See Box 1 for the hierarchy of complications.)

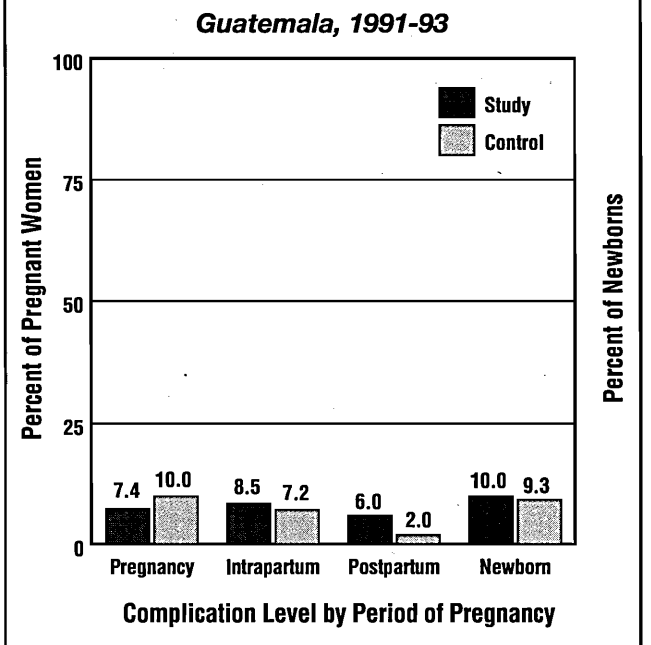
Results

Incidence of Complications

Impact of the training of TBAs was examined according to pre/post intervention time periods and by intervention/control area. Complication rate data were collected from 3,518 women and include 695 women with complications and 2,823 women with normal single pregnancies and births; women with twins (45), or women who delivered during implementation of the TBA training were excluded from the analysis. Overall, 20% of women reported one or more complications during pregnancy, labor/delivery or in the postpartum period. According to mothers' reports, almost one in 10 fetuses and newborns suffered from low birth weight/prematurity, asphyxia, neonatal sepsis, respiratory

Figure 3

WOMEN/NEWBORNS WITH COMPLICATIONS BY PREGNANCY PERIOD



Source: MotherCare, 1994

Table 6

DECISION-MAKING TO USE HEALTH CARE SERVICES FOR MOST SEVERE MATERNAL COMPLICATIONS—QUETZALTENANGO

	Use of Services by Women with Complications (%)*	
	Before (n=279)	After (n=239)
TBA Referred/Complied	19.2	13.3
TBA Contact Only	12.6	21.6
TBA Not Involved	23.6	25.8
Women Using Services	49	52

*Based on weighted numbers

Source: MotherCare, 1994

Box 1

Hierarchy of Complications—Quetzaltenango Project

I. **Antenatal complications.** If a woman had only one antenatal condition, there was no difficulty in coding her complication. However, there were 29 women with more than one antenatal complication. If a woman, for example, had a hemorrhage and edema, the hemorrhage and its management took precedence over the edema.

1. hemorrhage
2. edema and hypertension = pre-eclamptic toxemia (PET)
3. edema and anything else —— > edema
4. previous C-section
5. premature contractions

Malpresentation never took precedence over another complication.

II. **Intrapartum complications.** There were 49 women with more than one intrapartum complication.

1. transverse lie (member prolapse was always found with transverse lie)
2. prolonged labor (maternal exhaustion was always found with prolonged labor except once).
3. hemorrhage
4. premature rupture of membranes (PROM) (+ premature labor)
5. premature labor (+ breech)
6. previous C-section (+ breech)

Member prolapse, maternal exhaustion, fever, breech, or convulsions never took precedence over another complication.

III. **Postpartum complications.** There were 25 women with more than one postpartum complication.

1. convulsions (was never accompanied by retained placenta)
2. retained placenta
3. hemorrhage
4. fever
5. sepsis

Endometritis never took precedence over other complications.

IV. **Baby complications.** There were 72 newborns/fetuses with multiple complications.

1. absence of fetal movements
2. asphyxia
3. respiratory infection
4. sepsis

Low birth weight/prematurity never took precedence over other complications. Tetanus was never coded with another complication.

V. **"Double" hierarchy for maternal complications.** When looking at maternal complications, a woman could have had an antenatal problem, an intrapartum problem and/or a postpartum problem. There were 173 women who had complications at more than one time period. Babies were always analyzed separately.

In general, intrapartum complications took precedence over postpartum complications, which took precedence over antenatal problems.

1. delivery complication
2. postpartum complication
3. antepartum complication

The exceptions:

- Retained placenta took precedence over PROM, breech presentation and prolonged labor.
- Postpartum convulsions took precedence over postpartum hemorrhage, PROM and prolonged labor.
- Antepartum hemorrhage took precedence over PROM and premature labor.
- Prolonged labor took precedence over retained placenta.
- Endometritis took precedence over PROM.
- Edema took precedence over premature labor.
- Postpartum hemorrhage took precedence over previous C-section.

infections, tetanus or absence of fetal movements.

About 9% of women had complications during pregnancy, 8% during delivery and 4% during the postpartum period. There were no differences found in complication rates by intervention or control group. (See Figure 3). Only among postpartum complications was there a significant decrease from 6% to 2% between pre- and post-intervention periods.

Management of Complications ***(See Figure 2)***

Overall, about half of the women with complications (see Table 6) used health care services. This proportion did not change over the time of the project even with the interventions. Of those women who used services, about 55% had experienced some contact with a TBA, but those actually referred by TBAs decreased (from 19% to 13% pre- to post-intervention) of all women with complications.

Among the 518 women reporting a serious maternal complication included in the study, a third reported that TBAs were not present at the time the complication was experienced; after the intervention, 29% said they were not present when a complication was experienced. And, among the women *not* seen by a TBA at the time of the complication, use of health services actually increased (72% vs 88%).

Among women who reported having a TBA present at the time of the complication, detection of complications by TBAs actually decreased post-intervention, according to women (81% vs 68%). But if their complication was detected by a TBA, less than half of these women were referred; this did not change pre- to post-intervention. Of those women referred by TBAs, four out of five complied with the referral initially, but this proportion decreased over time (83% vs 62%).

Intrapartum complications result in death more often than complications experienced during pregnancy or in the postpartum period. Hence, focusing on that period (n=135 women with complications pre-intervention and 143 post-intervention) the general pattern is repeated! Nearly a third of women did not have a TBA present. Of these, four of five used health facilities. When a TBA was present, detection of the intrapartum complication followed the general pattern - a decrease in detection of the complication as reported by women (68% vs 54%), with less than half of those detected being referred (44% vs 44%). Compliance with TBA referral significantly declined in the post-intervention period to less than half.

Yet during the postpartum period, detection of complications by TBAs increased (78% vs 85%), referral increased (32% vs 46%), but compliance with referral decreased (95% vs 54%). However, the numbers are quite small.

Detection of newborn complications decreased after the intervention (80% vs 65%) and referral decreased (14% vs 5%). The likelihood that a TBA was present at the time of a fetal/newborn complication more than doubled after the intervention. Compared to women attended by a TBA, when no TBA was present women were 40 times more likely to use health care facilities!

The following are three basic questions which were asked to further assess the care that women with complications received:

1. What were the complications among women who never used health services? Were they different from those who received services?

	Got services	*No services*
Pregnancy	premature contractions	malpresentation
Delivery	transverse position	breech presentation
Newborn	sepsis respiratory infection	low birth weight asphyxia

2. Which complications were commonly detected and not detected?

	Detected	*Not detected*
Pregnancy	premature contractions	
Delivery	breech presentation	premature labor prolonged labor
Postpartum	retained placenta	
Newborn	asphyxia	low birth weight

3. Which complications were most frequently referred and not referred?

	Referred	*Not referred*
Pregnancy	hemorrhage malpresentation premature contractions	
Delivery	prolonged labor	
Newborn		asphyxia

Discussion

The probability that a maternal complication was attended to at a health care facility increased dramatically — 6 fold — when a TBA was *not* present compared with women with complications attended by a TBA. This suggests that either some women with complications go directly to health services and bypass TBAs, or that women do not have access to TBAs but do have access to health care facilities. Furthermore, the likelihood that a TBA detected the complication decreased by half after the intervention compared with before.

Thus, the intervention period appears to be significantly associated with a decrease in the detection of complications by TBAs and not associated with either an increase in referrals or the use of health care services by these women. However, when no TBA was present, there was an increase in service utilization (the proportion of women with postpartum complications using services almost doubled, 58% vs 96%) suggesting that women and their families on their own know to seek institutional care.

Conclusions

The analysis of the community-based (VERS) data shows little measurable impact of the TBA training intervention on complication rates and management of complications (with the possible exception of postpartum complications). The time span under scrutiny—one year post-intervention —may have been too short to detect behavioral changes. The size and scope of the study design and the use of retrospective reporting by women of events (up to six months) may have permitted reporting bias or inconsistencies in the definition of "referral."

A lack of differences between the intervention and the control areas may be due to the hospital staff training intervention which may have "contaminated" the control area. Improved interaction between personnel and TBAs and women may have encouraged all TBAs and women to access institutional services to a greater extent from anywhere in the area.

Only in the sphere of postpartum complications does there seem to be any sign of improvement. The incidence of postpartum hemorrhage, fever, and convulsions decreased significantly. Since the complications were reported by the woman and filtered through a physician interview, the decreases are not likely to be an effect of definition refinement by the TBA. Furthermore, detection and referral of postpartum complications increased among women who saw a TBA. The patterns are distinctly different from those of antenatal, intrapartum and newborn complications.

TBAs do not refer complications as often as they should, such as malpresentations, even when they are detected. The barriers to referrals, however, are complicated and appear to transcend the scope of the TBA training conducted. Is it that in this particular area where 40% of women live within one hour travel time of the hospital, that use of health services for complications is relatively normal from a family stand-point, whereas TBAs are expected to deliver women who have non-complicated births?

Commentary

1. Do improvements in the quality of care at the referral facility improve outcomes of pregnancy?

The improvements in the referral hospital for the intervention area, *Hospital General de Occidente San Juan de Dios,* included:

- development of protocols for the management of obstetrical and newborn complications;
- staff orientation to these protocols in a 40-hour training course;
- sensitization of staff to the culture of the women, families and the traditional birth attendants (TBAs) in the area;
- posters to remind staff that TBAs/families are also trying to save the lives of women and newborns;
- a retrospective perinatal/neonatal death audit; and
- some improvements in sanitation and organizations of service.

A neonatology specialist joined the hospital staff in 1990 and led the improvements in the neonatal wards and in management of newborns. Unfortunately, at the same time, the obstetricians were often out of work because of lack of payment. Continuous supplies and equipment to support the tasks as stated in the protocols could not be ensured; hence, some very important components did not always run as planned (note specifically the lack of oxygen in 1992 and its impact on newborn mortality). Service improvements did not include competency-based training using the protocols as the foundation for the curriculum and training materials; the "hospital training" was actually an orientation to the protocols given in didactic fashion. And while it was planned that the perinatal/neonatal death audit would take place every month, it was carried out retrospectively due to lack of time by hospital physicians.

The hospital perinatal mortality rate did decline after the improvements at the hospital, and while this is in the desired direction, the change was not significant. There were very few/no maternal deaths over this same period among referred women but, given the disruption in the obstetrical department caused by salary slowdown, management of women could not be followed through a death audit or record review of complicated cases versus the protocols. Instead, improvements in the obstetrical side are implied by the perinatal outcomes.

From the perinatal death audit, it appears that the greatest result of the interventions was to decrease the deaths of newborns suffering with sepsis and among those who were of birth weight ≥2500 grams. Asphyxia contributed a greater proportion of the deaths of newborns as sepsis declined, and even intensive training on resuscitation did not change the direction of this problem. Perhaps efforts to convince families to bring women into the hospital before labor is termed "prolonged" would have an impact on this problem. According to interviews with women, prolonged labor is not detected by TBAs, although neonatal asphyxia is; unfortunately, women reported they were not referred nor did they generally use services for this problem.

Did development and orientation to protocols for managing obstetrical and newborn complications make a difference in terms of the deaths due to sepsis? It is not possible to determine what the crucial factor was, as the impact of protocols is confounded by a neonatologist joining the hospital staff at the same time. The neonatologist assisted with the development of the protocols and proceeded to implement them. (A perinatal death audit was ***not*** a factor in this improvement although audits have been found to impact on quality of care in other studies [Bhatt, R.V., 1989; Bugalho and Bergstrom, 1993]). Unfortunately, the audit was only implemented retrospectively in Quetzaltnenango. A recent review of the impact of clinical guidelines on provider prac-

tice and patient outcomes found that protocol development and implementation has been successful in making significant changes in the process of care in the direction proposed by the guidelines in all but 4 of 59 studies reviewed. Looking at patient outcomes, all but 2 of 11 studies found some significant improvement (Grimshaw and Russell, 1993). This review focused only on investigations of clinical guidelines designed for medical staff that evaluated the introduction of guidelines in terms of the process of medical care or the outcome for patients. It also collected enough data for meaningful statistical analysis and, most importantly, had a rigorous study design.

While it remains impossible to distinguish which factor caused improvement in the technical quality of care for neonatal sepsis and whether this could have been increased or strengthened for other causes of perinatal mortality beyond sepsis as well as for maternal health, we do know that referrals increased to the hospital, both from the intervention as well as from non-intervention areas. This increase in referrals was seen from hospital records; numbers were too small to be picked up from community surveillance. Hence, something about the hospital itself generated demand. Given that the "hospital training" seems to be the only change that was detected prior to the increase in recorded referrals, it is anticipated that the intervention of importance is the sensitization of the hospital staff to the culture of birthing in the community it served, including opening its doors to welcome in the family and TBA of the woman. Waiting time decreased for those complications that require immediate attention, e.g., postpartum hemorrhage—one of the concerns women had spoken about as a barrier to using formal health facilities for their care. Improving the "quality of care" was perceived by women to be important, such as allowing family, friends and community providers, e.g., the trusted TBA, to accompany one to the hospital. This is likely to have encouraged TBAs to increase their referrals to the hospital.

2. Does TBA training help to increase detection and referral of women and newborns with complications to the improved facility?

What appears to be at odds with the conclusions from the hospital study are the results from the community surveillance. First, according to women's answers to the community-based survey, referrals by TBAs did ***not*** increase over the course of the project; rather, proportionately more women and families with complications went on their own to the hospital in the post-intervention year. This seeming conflict could not be validated by comparison of data from the community surveillance and hospital records as these data sets were not linked. Secondly, the hospital study only focused on women who stated they had been referred by TBAs, and not on all women who delivered at the hospital with or without complications and who may have self-referred or been brought directly by their families. Given that the numbers are small, it is anticipated that the results of hospital records showing increased referrals is diluted when one looks at the community data.

What is important to recognize in this project is that nearly half of the women with complications used health services even before the interventions took place, and this percentage did not significantly increase after the interventions (49 vs 52%). Approximately a fifth of women with complications who used health facilities did so at the referral by TBAs prior to the interventions. Afterwards, this proportion decreased to 13%. More women were going to services after the interventions either directly or in spite of the TBA who didn't recognize the complication (recognition declined from 81% pre-interventions to 68% post-interventions). In some cases, the TBA did not refer the woman, or the woman stated she did not accept the referral but went to a health facility anyway.

The weight families place on services and on TBAs becomes more apparent when one looks at the timing of TBA involvement. More than four out of five women saw a TBA for

prenatal care, regardless of whether the woman experienced a complication. Two thirds of women with antepartum complications who used services had seen a TBA; the other third went directly to services. Intrapartum and postpartum complications seemed to signal more danger to families, and 52% and 65% of women with such complications respectively who used services did so directly; no TBA was involved. Fetal or newborn complications seemed to be given the most weight in families with nearly 91% going directly to services among the over 53% women with such births who ultimately did use services for these complications.

The effect of the Quetzaltenango community-based interventions appears negligible, according to women surveyed, not because the TBAs' role in referral is negligible, but because they appeared to be already referring a significant proportion of complicated cases before the interventions. More significantly, women were already seeking out health facility use even without a TBA. These data suggest an independence on the part of the woman and her family in seeking out services when they determine there is a complication. Some women go directly to health services, bypassing the TBA; another explanation could be that women don't have access to TBAs but have access to health facilities. They may have been planning to use health services already and did so when they recognized a complication.

Women in this study area are not that distant from the referral hospital; approximately 42% are within 60 minutes of the hospital. Roads are relatively good and transport is available. Use of services for women with maternal complications appears to be fairly normal behavior, although uncomplicated births at home with a TBA is the common procedure in Quetzaltenango. Improving the recognition and timely referral of complicated cases by TBAs did not appear to make a major difference in the community most likely because of this already existing pattern of use of services for complications.

Three important lessons are learned from the Quetzaltenango Maternal and Neonatal Health Project:

1. Lesson learned for Step 4 of the Pathway to Survival on Quality of Care:

A positive image of the referral hospital has proven effective in increasing use of services. As no advertisement was made of the changes at the hospital, the news must have passed rapidly by word of mouth. A "woman - friendly" hospital appears to generate its own demand, at least in the immediate area; Quetzaltenango is an area where 42% of women live within one hour of the hospital and transport is relatively easy to find. The reverse of this was confirmed in the Danfa project in Ghana: women preferred TBAs in that setting because of their fear of anticipated treatment, described as painful and disrespectful, in the hands of medically trained staff (Eades et al., 1993).

2. Lesson learned for Step 1, 2 and 3 of the Pathway to Survival addressing access issues:

Little is known about decision-making in families with regard to seeking care for complicated obstetrical or neonatal problems. However, it appears that it is the family that will take the decision. They may be influenced by TBAs, but as seen in this periurban project and in the rural areas of Forteleza, Brazil, where a project to connect TBAs and their clients with hospital back-up had been on-going over a 10 year period, the TBA was by-passed when a complication occurred more often than not (Bailey et al., 1991; Janowitz et al., 1988). Hence, the importance of focusing on the family not only for recognition of complications, but also because they are the primary decision-makers for determining whether and where women will seek care, is now obvious.

3. Lesson learned on measurement issues:

Whether or not women with complications deliver in the referral facility is most easily (and

with less cost) determined through an examination of well-kept facility records rather than through community surveys in which numbers are small. In addition, if one is asking the more specific question of whether the woman with complications delivering at a facility was referred by a TBA (or other provider), there is even more reason to focus on hospital records and ensure their quality.

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Marjorie Koblinsky and Deborah Gordis, Technical Editors
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MotherCare regrets an oversight in a past issue of ***MotherCare Matters.*** Credit is given to Joan Sullivan for her photograph of a woman and child in Malawi which can be found in Volume 4, No. 2; *"Healthy Pregnancy, Safe Delivery—The MotherCare Experience"* on page 11. We sincerely apologize for the omission, and we would like to take this moment to thank Joan for her artistic contribution to our newsletter.

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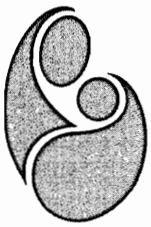

MotherCare™ Matters

A QUARTERLY NEWSLETTER AND LITERATURE REVIEW ON MATERNAL AND NEONATAL HEALTH AND NUTRITION

MICRONUTRIENTS FOR THE HEALTH OF WOMEN AND NEWBORNS

Introduction

Deficiencies in iron, iodine and vitamin A are widespread among the populations of developing countries. Because the prevalence and consequences are known and the cost-effective interventions to address these deficiencies have been identified, international attention is now focused on reducing the prevalence of deficiencies of these three micronutrients. Yet, questions remain on how best to design, implement and evaluate programs aimed at addressing these three micronutrient deficiencies. In this issue of ***MotherCare Matters,*** three questions important to program managers of iron supplementation efforts are reviewed.

How Can Iron Supplementation Programs Be Improved?

To answer this question a recent editorial in the *American Journal of Clinical Nutrition* is reviewed that discusses why iron supplementation programs have failed and what is needed to improve them. Because there is currently much international discussion about what iron dose is needed, the editorial points out that improving iron supplementation programs will be independent of the dose. **A commentary reviews the recent weekly or intermittent dose trials in light of these programmatic issues and recommends further scrutiny of research conclusions prior to initiating any change in present program policies.**

Is Pallor Sensitive Enough To Identify Women With Severe Anemia?

In areas where anemia prevalence is high, the United Nations Subcommittee on Nutrition recommends that all pregnant women receive iron pills since screening for this deficiency would not be cost-effective. However, certain subgroups of women could benefit from screening, such as those with severe anemia who might require additional care. **The results of a MotherCare literature review on pallor screening to identify women with severe anemia is presented followed by a commentary on MotherCare program recommendations about pallor screening.**

When Do Cutoffs For Hemoglobin Change?

In the few cases where screening is required or where a survey is necessary to evaluate program success, hemoglobin cutoffs will be needed. A review of an article on this subject suggests how hemoglobin cutoffs change with altitude. **A commentary reviews when cutoffs for hemoglobin should be used and how they change with sex, age, pregnancy status and altitude.**

These reviews highlight iron deficiency anemia because of its high prevalence and importance to the health of women and newborns. However, interventions for other micronutrients, more commonly known as vitamins and minerals, also may be needed to ensure good health for women and small children. Calcium, zinc and folic acid deficiencies have all been associated with poor birth and/or delivery outcomes. In the last section of this issue, answers to a final question are sought.

Should Deficiencies in Calcium, Zinc and Folic Acid Be Addressed in Programs That Aim to Improve The Nutritional Status of Women and Newborns?

Three articles that attempt to answer this question are reviewed. Each are followed by commentaries that give program recommendations for addressing these deficiencies in developing countries.

Information from the above reviews is used in the final commentary to make recommendations on how best to address deficiencies of these micronutrients in programs in developing countries. In an effort to make ***MotherCare Matters*** more practical for people implementing health and nutrition programs affecting women and newborns, this issue also contains a **"MotherCare Program Essentials" center pullout insert. This pullout reviews the program recommendations made in this newsletter and gives additional information (e.g. cutoffs, recommended intakes, food sources, etc.) that may be useful in implementing effective micronutrient malnutrition control programs.**

MotherCare Programs and Applied Research to Control Micronutrient Malnutrition

1. Delivery of iron supplements to pregnant women is being improved in existing national programs in selected districts of Bolivia, Guatemala and Indonesia. Improved dietary intakes of foods rich in energy, vitamin A activity and, where appropriate, iron, during the pregnancy and postpartum periods also are promoted. Postpartum vitamin A and iron supplements are distributed and promoted in at least two of these countries. In addition, breastfeeding practices are encouraged as a major child survival intervention for the newborn, as well as a means of delivering these micronutrients to young infants. Iodine deficiency is a problem in the countries where MotherCare is active and is being addressed by UNICEF through the fortification of salt with iodine.
2. Six non-governmental organizations in India, Indonesia and Malawi are conducting anemia control projects with strategies based on studies of the prevalence and etiology of anemia, the perceptions of the motivation to accept and comply with the regimen among women and the perceptions of providers' motivation to supply the tablets.
3. The impact of vitamin A on maternal and neonatal health is being assessed through a study in Indonesia to determine if low doses of vitamin A during pregnancy can reduce maternal and neonatal sepsis.
4. Improving iron status in adolescent girls is a topic of research being conducted in Peru and India, including experiments on ways to improve iron status through increased dietary intake of iron-rich foods.

Rae Galloway, Nutrition Advisor and Marjorie Koblinsky, Director

SECTION ONE

IRON SUPPLEMENTATION PROGRAM QUESTIONS

How Can Iron Supplementation Programs Be Improved?

R. Yip (1996). Iron Supplementation During Pregnancy: Is It Effective? American Journal of Clinical Nutrition 63:853-5.

Yip wrote this editorial in response to an *American Journal of Clinical Nutrition* article in the same issue entitled, "Effects of Weekly Iron Supplementation on Pregnant Indonesian Women are Similar to Those of Daily Supplementation" by Ridwan, *et al.* The study in question was conducted to verify claims that absorption of iron significantly improves when iron is taken weekly or intermittently rather than daily, so that a weekly dose of iron is as efficacious as a daily dose. In other words, the absolute amount of iron provided by taking one iron pill per week equals the amount provided by taking an iron pill daily for seven days.

This editorial reviews why recommendations that women take a daily dose of iron during pregnancy have been made. Well controlled and conducted iron supplementation trials over the last 30 years show a positive effect on hemoglobin levels when women take a daily iron pill. The results from these trials show that the improvement in hemoglobin is dependent on initial hemoglobin levels and the dose and duration of iron given. The studies also provide evidence for international recommendations that pregnant women take a daily dose of iron to meet their increased requirements for absorbed iron (greater than 4 mg per day or nearly three times the amount needed by non-pregnant women) which cannot be met through the diet, even when the diet contains sources of iron that are highly bioavailable (e.g., meat). Despite the proven efficacy of giving iron pills, "scaling up" these small trials into national programs has been disappointing and unacceptably high rates of anemia in developing countries persist, where over 50 percent of pregnant women are anemic. Even in the United States, "where universal iron supplementation is practiced, more than 30% of low-income pregnant women are anemic during the third trimester of pregnancy, which indicates significant iron deficiency."

Why haven't these programs been effective? "For most therapeutic regimens, it is expected that the effect based on routine application (effectiveness) will be lower than the effect initially observed during vigorous clinical trials (efficacy)." For iron, there is a much larger differential than might be expected between the results from controlled trials and returns from programs.

"Ibu Sehat - a healthy pregnant woman takes iron pills," IEC message on taking iron pills to prevent anemia from MotherCare I Indramayu Project. Ibu Sehat was part of an Information, Education, and Communication (IEC) package of materials developed for the University of Indonesia/MotherCare Indramayu Project. The Manoff Group was the MotherCare subcontractor responsible for developing the IEC Package.

Several limiting factors affecting these programs are suggested:

- ✦ **Availability of supplies of iron pills (affected by cost and logistics).**
- ✦ **Access to care (ability of the primary health care system to deliver pills).**
- ✦ **Provider behavior (motivation of health care providers to provide appropriate counseling).**
- ✦ **Client compliance (motivation of women to take pills).**

Most of these problems will exist whether women are taking a daily or a weekly dose. Yip then compares how the weekly or intermittent and daily dose regimens would perform based on the above criteria. In the first case, cost would be less with a weekly dose and should be easier to sustain programmatically. However, making sure that the logistics are in place so that iron pills reach health clinics will be a problem when delivering either a weekly or daily dose of iron. Problems with access to health care and the motivation of health care providers to distribute pills and provide appropriate counseling will be no different for the weekly and the daily doses. Advocates of the weekly dose claim that compliance will improve if women only need to take one pill per week. There is evidence in the medical compliance literature to support that taking fewer pills per day improves compliance. Nevertheless, experience with weekly malaria prophylaxis does not support this argument. Yip also surmises that a larger weekly dose might cause more side effects and even poorer compliance than a smaller daily dose.

Based on the problems with existing programs, several recommendations are made on how to improve national iron supplementation programs for pregnant women:

- ✦ **Ensure that there are enough iron pills for all pregnant women throughout pregnancy.**
- ✦ **Ensure that supplies of pills are reaching every level of the health system.**
- ✦ **Conduct qualitative research to determine the barriers to taking iron supplements.**
- ✦ **Develop motivational messages and materials to promote compliance.**
- ✦ **Train health care providers so they are committed to the problem and can address identified barriers.**

Two important barriers that need to be addressed are identified in Yip's editorial: First, women need to be told about the importance of taking iron supplements; and second, they need to know about potential side effects and how to manage them. One way to control side effects is to give a lower daily dose of iron to those women with persistent gastrointestinal upset.

Yip suggests that "the issue at hand is not whether a weekly iron dose is beneficial or not, but whether pregnant women are able to receive and take iron tablets as prescribed." A recommendation is made to direct resources to exploring other approaches to improving iron status beyond pregnancy, implying that the iron status of women may be significantly improved **before** they enter pregnancy. Introducing schemes to fortify foods that are widely consumed by vulnerable groups and giving a weekly dose in supervised settings such as schools and places of work may be more appropriate and effective programmatic approaches.

Commentary

There are two important issues pertaining to iron supplementation programs. The first relates to the efficacy of a weekly or intermittent dose of iron. Since most iron supplements in developing countries are targeted to pregnant women, the scientific community needs to determine if a weekly or intermittent dose of iron provides enough iron to meet the requirements of women during pregnancy and **prevent** anemia. The second issue, which is independent of the dose of iron required, is how to actually improve existing iron supplementation programs.

The editorial reviewed here does not directly address the efficacy of a weekly or intermittent dose of iron. It is implied that the major obstacle to improving iron supplementation programs is the delivery of these supplements and therein should lie the focus; dosing alternatives should not be the primary question. However, since some developing countries already have and others soon may change their policies of giving pregnant women a daily dose of iron to a policy of giving a weekly or intermittent dose of iron, the question about the efficacy of the weekly or intermittent dose is a significant one. If countries wish to improve their iron supplementation programs, is it valid (i.e., would women receive the amount of iron they need during pregnancy) to focus solely on improving the delivery of and compliance with a weekly or intermittent dose of iron?

As a result of interest in the weekly or intermittent iron dose studies and concern that the weekly or intermittent dose may not be in the best interests of pregnant women, MotherCare conducted a literature review of currently published studies on this subject. Results of this review show that there are nine published studies on the efficacy of the weekly or intermittent dose of iron compared to the daily dose. Four studies have been published in peer-reviewed journals (Liu, *et al.,* 1995a; Schultink, *et al.,* 1995; Cook and Reddy, 1995; and Ridwan, *et al.,* 1996), and the rest as either letters to the editor (Gross, *et al.,* 1994) or as abstracts (Liu, *et al.,* 1995b; Viteri, *et al.,* 1995 as reported in Viteri, *et al.* 1996a; Viteri, *et al.,* 1996b; Chew, *et al.,* 1996) in the proceedings from scientific meetings. MotherCare reviewed all but the Viteri, et al., 1995 abstract and found that, in most cases, impact on hemoglobin or iron status is better for the daily dose but that there was no significant difference in performance between the daily and weekly or intermittent iron dose. Only one study provided convincing documentation that pill-taking was strictly supervised. If trials were not strictly supervised there would be no way of knowing if women were taking a daily or weekly dose of iron. Other problems with the studies include small sample sizes, short periods of supplementation, and the absence of controls.

In the only study (Cook and Reddy, 1995) that does not advocate the weekly iron dose, researchers found no evidence for the claim that absorption is greater for the weekly versus the daily dose of iron. This study raises an important question about how much iron the weekly dose can provide to pregnant women to meet their 4 mg of iron per day requirement (or 1,000 mg total during pregnancy). The absorption for a 60 mg weekly dose taken for 40 weeks would have to be greater than 40% to provide the 1,000 mg needed during pregnancy. This correlates with previously published information on absorption from small amounts of iron (less than 1 mg) consumed daily (Bothwell and Charlton, 1981), but it is has not yet been shown that larger doses of iron can provide this result when taken weekly.

Based on this review, it is premature to change existing policies and practices of giving a daily dose of iron to pregnant women. All the weekly or intermittent iron dose studies need to be published in peer-reviewed journals, scrutinized by international experts and found to be efficacious. Currently, work is underway to do just that. **The Canadian International Development Agency (CIDA) is funding a "Cross Project Analysis," headed by Dr. George Beaton, Professor Emeritus at the University of Toronto, of the published and unpublished weekly or intermittent iron dose trials.**

Before the results of this analysis become public, the editorial by Yip gives solid recommendations on how to improve existing national antenatal iron supplementation programs. MotherCare is working in Bolivia, Guatemala, Honduras, India, Indonesia and Malawi to improve existing iron supplementation programs using the steps outlined by Yip and additional steps outlined in **Box 1 of the center pullout.**

Baseline surveys have been conducted to determine the prevalence and risk factors for anemia (e.g., protein-energy malnutrition, pill-taking behavior, parity, age, etc.) and barriers to taking iron pills. Training and information, education and communication (IEC) strategies are being developed to motivate health workers to give

women iron pills and to motivate women to take them over the entire course of pregnancy. Findings from qualitative research suggest that women like taking iron pills (as long as they are counseled on how to manage side effects) for the short-term because iron pills make them feel better and they believe the pills are good for their babies. Most women also visit the health system at least once during their pregnancy so they can obtain 30 pills, the amount often distributed. It is more difficult for women to take all the pills they require. This is due to limited access to the health system and because women present for antenatal care late in pregnancy. To resolve this problem, MotherCare is promoting community-based distribution in all its programs, whereby community health workers (e.g., village midwives, traditional birth attendants) give iron pills to local pregnant women. To make up for shortfalls in the supplies of pills in the public health system, women are encouraged to buy them through the private sector where pharmaceutical supplies of iron are available and the Ministry of Health allows this type of promotion.

Access and supplies are not the only factors affecting how many iron pills women will take. Many women forget to take or tire of taking a pill everyday. Taking any drug during pregnancy is discouraged in most settings and women apply this recommendation to iron pills which they see as a medication that will somehow harm them or their babies. In at least one country, women understand the need for iron pills to correct "low iron", but fear that having "too much" blood might cause them to bleed more during delivery. In other countries, taking too many iron pills is associated with having bigger babies and more difficult deliveries. Addressing beliefs such as these is vital if we want women to take the recommended number of iron pills during pregnancy.

MotherCare will be sharing the results of these programs in future issues of MotherCare Matters. We encourage those of you working to improve iron supplementation programs or with anecdotal information on the barriers to taking iron pills to write us and share your experiences.

Rae Galloway, Nutrition Advisor

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When is it Necessary to Screen Women for Anemia?

E. Dusch. Clinical Screening: Everyone Does It But How Sensitive Is It? A Forthcoming MotherCare Working Paper.

Introduction

Most Ministries of Health in developing countries have policies to screen pregnant women for anemia (low hemoglobin [Hb]) and to give those with anemia iron pills. However, where anemia prevalence is high, it is more cost-effective to give iron pills to all pregnant women to meet their increased requirements for iron (ACC/SCN, 1991).

Because of the life-threatening consequences of severe anemia (Hb <7g/dL) for the mother and her infant, it would be useful to identify, treat and follow-up with women who are severely anemic. However, because laboratory tests that would be able to detect the majority of women with anemia are expensive, it is unrealistic to recommend laboratory screening for these cases. While clinical or pallor screening is low in cost, it is a poor way to detect mild to moderate anemia (Hb 7-11g/dL). However, it may be useful in identifying women with severe anemia.

Pallor screening is the identification of anemia by examining the face, inner lower eyelids or conjunctiva, palms, nailbeds and other body parts for paleness or pallor which may be a sign of anemia. The objective of this review was to determine just how *sensitive* (the ability of a test to correctly identify individuals who are truly anemic) pallor screening is to identify individuals with severe anemia so they might be treated appropriately. For our purposes, we were interested in identifying women who were truly severely anemic; therefore, we focused on sensitivity. Results on *specificity* (the ability of a test to correctly identify individuals without anemia) are generally higher for clinical screening than for sensitivity and will not be presented here.

Methods

A Medline search of the literature from 1978-1995 was used to identify studies for review. Key words used to conduct the search included: "anemia and pallor"; "anemia and clinical signs"; "testing, sensitivity, and anemia"; and "anemia and physical examinations". Sixteen studies were found in which clinical signs, mainly pallor, were used to identify anemia. These studies included mixed populations of men, women, pregnant women and children from both developed and developing countries. Physicians and other health workers of various skill levels and experience were used to conduct the screening. Most of these studies examined paleness of several different areas, such as the face, nailbeds, tongue, palms and conjunctiva. Six studies (Thaver and Baig, 1994; Khan, *et al.* 1990; Kalra, 1986; Wurapa, *et al.* 1986; Glass, *et al.* 1980; Jacobs, *et al.* 1979) examined the sensitivity of pallor or clinical signs for identifying mild anemia, and ten studies (Luby, *et al.* 1995; Meda, *et al.* 1993; Gujral, *et al.* 1989; Sanchez- Carrillo, 1989; Sanchez-Carrillo, *et al.* 1989; Nardone, *et al.* 1990; Strobach, *et al.* 1988; Shah, *et al.* 1984; Gjorup, *et al.* 1986; Ghosh and Mohan, 1978) examined the sensitivities for a number of different cutoffs used to detect mild to severe anemia. **(See Box 3 in the center pullout for Hb Cutoffs.)** To determine sensitivities, clinical signs were compared with a "gold standard" for measuring Hb, usually a laboratory test.

Results

Pallor is most sensitive in detecting severe anemia (in pregnant women Hb <7g/dL and in children Hb<5g/dL). One study found that the sensitivity of clinical screening was as high as 93% for identifying children who were severely anemic (Hb <5g/dL) (Luby, *et al.,* 1995) and another study including men, women and children identified 100% of people with Hb <6g/dL (Ghosh and Mohan, 1978). Yet, Meda, *et al.* identified only 63% of anemic women with Hb <9g/dL and only 16% of women with Hb<11g/dL. Nardone *et al.* achieved sensitivities of 65%, 77% and 80% for clinical signs

using Hb cutoffs of 13g/dL, 12g/dL, and 10g/dL, respectively. The sensitivity of clinical screening for severe anemia in men (defined as Hb <10g/dL) was 81%, while the sensitivity of using clinical signs to identify men with moderate anemia was only 50% (Strobach, *et al.*, 1988). These studies confirm that pallor is not sensitive enough to identify moderate to mild anemia, but it becomes a better test for severe anemia.

Commentary

As the literature review showed, pallor screening should not be relied on to identify women with mild and moderate anemia. However, pallor screening may play a role in identifying women with severe anemia, especially in places with limited resources and equipment. With this in mind, MotherCare reviewed each study for possible ways to improve the sensitivity of pallor screening in a field setting. One way is to train community health workers and physicians by letting them compare their skills to identify anemia using clinical skills or pallor with a gold standard for hemoglobin measurement. Additionally, using a combination of examination sites to look for pallor and comparison aids such as color tint scales appear to improve the sensitivity of using clinical signs or pallor to identify people with anemia. **To further investigate the usefulness of pallor to screen for anemia, MotherCare will be conducting the following activities in its programs:**

- ✦ Confirm the results of this literature review by determining the sensitivity of conjunctival pallor in identifying women with mild to moderate anemia (7-11g/dL) and those with severe anemia (5-7g/dL) and very severe anemia (<5g/dL) in baseline studies.
- ✦ If the sensitivity of pallor screening is high (80%) for severe anemia, use clinical signs or pallor screening to identify women with severe anemia to give them more iron/folate tablets and special follow-up attention including counseling on how to manage side effects. (MotherCare has arbitrarily set "high sensitivity" at 80%.)
- ✦ Train health workers to use pallor to screen for severe anemia, but to not depend upon it to identify pregnant women with mild to moderate anemia.
- ✦ Improve pallor screening techniques by training health workers to compare their estimations of pallor with blood analysis for Hb.

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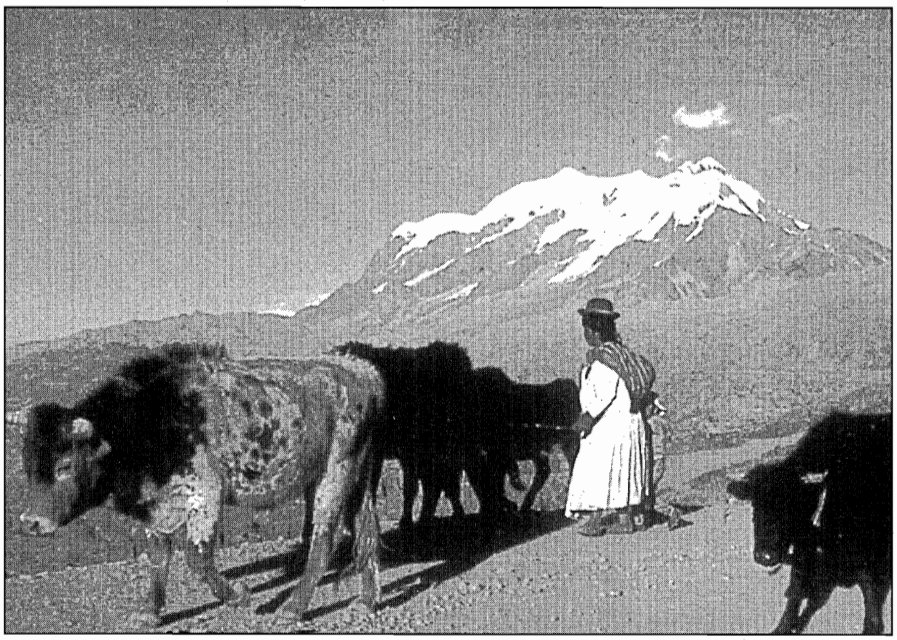
When Do Cutoffs for Hemoglobin Change?

H. Dirren, M.H.G.M Logman, D.V. Barclay, and W.B. Freire (1994). Altitude Correction for Hemoglobin. European Journal of Clinical Nutrition 48:625-632.



Changing with Altitude: Hemoglobin cutoffs. Photo courtesy of Susan Brems

Introduction

Oxygen partial pressure and arterial blood saturation decrease with increases in altitude. To compensate for this, hemoglobin (Hb) concentration increases to provide a greater number of binding sides for available atmospheric oxygen. Thus, people living at high altitudes, particularly Andean Highlanders, have higher normal Hb concentrations when compared to people living at sea level. This physiological adjustment is important for anemia control programs that focus on screening to identify anemic individuals or where anemia prevalence surveys are conducted because the cutoffs for anemia will vary depending on the altitude.

Methods

A correction factor of a 4% increase in Hb for each 1000 meters has been suggested and is commonly used (Dallman, *et al.,* 1980; Estrella, *et al.,* 1987). However, a study by Dirren and co-authors confirms previous data in adults (Hurtado, *et al.,* 1945) that the increase in Hb might be exponential rather than linear. Dirren and colleagues used national Hb data on 469 Ecuadorian girls and boys (ages 6-59 months) living at different altitudes (sea level to 3400 meters) to propose correction factors for Hb caused by changes in altitude. All children had normal iron status (serum ferritin >10 mcg/L and transferrin saturation >12%, zinc protoporphyrin <2.8 mcg/g Hb).

Results

The authors constructed a free exponential curve through their data and recalculated Hb cutoffs for different altitudes accordingly. They conclude that this exponential relationship between altitude and Hb is supported by an exponential decline in the atmospheric partial pressure of oxygen with altitude. They also offer the caveat that these cutoffs are appropriate for children living in South America but might change for populations living in other high-altitude settings. According to the authors there is research in adolescents and males living in the Himalayas showing that mean Hb values are lower than Andean residents living at the same altitudes. Reasons for this are not clear but suggestions are that there may be different adaptations among ethnic groups, that atmospheric pressure changes with latitude as well as altitude, that the methodologies for the studies were dissimilar and/or that different environmental and disease patterns exist.

Commentary

Cutoffs for hemoglobin (Hb) vary due to age, sex and pregnancy status **(See Box 3 of the**

center pullout). The paper by Dirren, *et al.,* shows how Hb cutoffs also change by altitude and gives suggested cutoffs for altitudes above sea level **(See Box 4 of the center pullout)**. As stated in the previous article, screening for anemia is not necessary or cost-effective where anemia prevalence is high. However, there are certain instances where cutoffs for Hb are needed. First, when a women with maternal complications is identified, it would be useful to make sure she does not have anemia. Second, cutoffs also may be needed to evaluate the impact of an anemia control program. When cutoffs are needed, health workers and program managers will need to be informed about tests for Hb. To sort out what type of Hb test may be appropriate to use, a new publication by Program for Appropriate Technology in Health or *path* **(See Box 5 of the center pullout)** reviews available tests for anemia that can be used in resource-rich settings or for program assessments.

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SECTION TWO

CALCIUM, ZINC AND FOLIC ACID SUPPLEMENTATION QUESTIONS

Does Calcium Have a Role in the Prevention of Hypertensive Disorders of Pregnancy?

Introduction

Hypertensive disorders of pregnancy are major contributors to maternal and fetal morbidity and mortality. Two forms of hypertension, preeclampsia (hypertension with proteinuria) and eclampsia (hypertension with proteinuria and convulsions) continue to be major causes of maternal death in developed, as well as developing countries.

Early animal studies and epidemiological observations **(See Box A)** suggesting an inverse relationship between dietary intake of calcium and blood pressure, pregnancy-induced hypertension (PIH), preeclampsia and knowledge about calcium's physiological functions **(See Box B)** piqued interest in calcium as a way to prevent and treat hypertension. Following is a review of two papers that demonstrate there is no conclusive evidence that calcium has a protective effect against the development of hypertensive disorders of pregnancy.

Calcium Supplementation During Pregnancy—A Systematic Review of Randomised Controlled Trials

G. Carroli, L. Duley, J. Belizán, and J. Villar (1994). British Journal of Obstetrics and Gynaecology 101:753-758.

Methods

Carroli, *et al.* reviewed six randomized, controlled calcium supplementation trials that included 1,700 pregnant women, mostly primigravidas from Argentina, Ecuador, Italy and the United States.

Results and Conclusions

Supplementing women with between 1-2 grams of calcium per day (the daily recommendation is 1.2 g) for 10-20 weeks was associated with a 50% decrease in PIH. The risk of developing preeclampsia was 45%-75% lower among women receiving calcium than among women in the control group. The authors also examined the association of calcium and preterm delivery, Cesarean sections, intrauterine growth retardation (IUGR) and perinatal death but concluded that the sample sizes were too small to draw any conclusions.

Effect of Calcium Supplementation on Pregnancy-Induced Hypertension and Preeclampsia

H. C. Bucher, G. Guyatt, R. Cook, R. Hatala, D. Cook, J. Lang, and D. Hunt (1996). Journal of the American Medical Association 14: 1113-1117.

Methods

Bucher, *et al.* conducted a meta-analysis of 14 randomized controlled trials on the effects of PIH and other pregnancy outcomes involving 2,549 pregnant women who were given 1-2 grams of calcium per day. Their analysis included the six studies reviewed by Carroli, *et al.*

Results and Conclusions

The researchers found that in 11 trials, calcium reduced both systolic and diastolic blood pressure. Preeclampsia incidence in nine trials was lower in women receiving a calcium supplement. Hypertension was examined in eight studies and was lower for women receiving

Box One—Improving Iron Supplementation Programs

- Ensure enough iron pills for pregnant women.
- Provide iron pills that consumers like (e.g., small, coated and red) and preserve the quality through appropriate packaging.
- Ensure that iron pills reach all levels of the health system and promote community-based distribution to improve coverage.
- Determine barriers to taking iron pills through qualitative research or participatory methods.
- Develop motivational messages and materials to promote compliance.
- Train health workers so that they use the messages and materials to improve compliance.
- Give presumptive treatment for hookworm during the second or third trimester where prevalence is high (>20-30%) with one of four drugs (albendazole, levamisole, mebendazole or pyrantel).
- Give complementary dietary messages: increase intake of iron enhancers (e.g., vitamin C-containing foods) and avoid iron inhibitors (e.g., tea, coffee); use food processing to decrease iron inhibitors (e.g., soaking staples, fermentation); consume iron-fortified foods where they exist.

Source: Yip (1996); J. McGuire (1994). Winning the Battle Against Anemia. HRO Notes 25. The World Bank; WHO (1994). For complete Yip and WHO references, see main paper.

Box Two—Recommended Doses of Elemental Iron for Pregnant Women

	Population-Based Presumptive Treatment		Individual Treatment
	Where Anemia Prevalence is Mild (<20%)	Where Anemia Prevalence is Moderate/High	Severe Anemia (Hb <7 g/dL)
Iron	1*60 mg/day	2*60 mg/day	3*60 mg/day for four weeks, afterwhich 2*60 mg/day should be taken
Folic Acid	1*250 mcg folic acid/day	1*500 mcg folic acid/day	3*250 mcg folic acid/day for four weeks, afterwhich 1*500 mcg folic acid/day should be taken

Source: From WHO as cited in Levin, H. E. Pollitt, R. Galloway and J. McGuire. (1993). Micronutrient deficiency disorders. In: (D. Jamison, W.H. Mosley, A. Measham & J.L. Bobadilla). *Disease Control Priorities in Developing Countries.* Oxford Medical Press: The World Bank and WHO (1994). Indicators and strategies for iron deficiency and anaemia programmes. Draft Report.

Box Three—Hb (g/dL) Cutoffs for Anemia by Age and Sex

Children 6mos-6yrs	<11.0
Children 6yrs-14yrs	<12.0
Adult males	<13.0
Adult females, non-pregnant	<12.0
Pregnant females	<11.0

Source: Levin, *et al.*, 1993 (See Box 2 for complete reference).

Box Four—Recommended Hb (g/dL) Cutoffs for Anemia in Children (6-59mos) and Women Living at Different Altitudes

Altitude (m)	Cutoff Hb (g/dL)	Altitude (m)	Cutoff Hb (g/dL)	Altitude (m)	Cutoff Hb (g/dL)	Altitude (m)	Cutoff Hb (g/dL)
0	<11.0	900	<11.3	1800	<11.8	2700	<12.6
100	<11.0	1000	<11.4	1900	<11.9	2800	<12.7
200	<11.1	1100	<11.4	2000	<12.0	2900	<12.8
300	<11.1	1200	<11.5	2100	<12.1	3000	<12.9
400	<11.1	1300	<11.5	2200	<12.1	3100	<13.0
500	<11.2	1400	<11.6	2300	<12.2	3200	<13.2
600	<11.2	1500	<11.7	2400	<12.3	3300	<13.3
700	<11.3	1600	<11.7	2500	<12.4	3400	<13.4
800	<11.3	1700	<11.8	2600	<12.5	3500	<13.6

Source: Dirren, *et al.*, 1994

Box Five—Anemia Detection in Health Services Guidelines for Program Managers, PATH/USAID, April, 1996

Hemoglobin is the most commonly used measure of iron deficiency which is the main cause of anemia in pregnant women and other vulnerable groups. This useful manual reviews 10 measures for assessing anemia (e.g., copper sulfate, Sahli, etc.) and rates each by level of skill required, complexity, accuracy and precision, length of time it takes to obtain results and the cost of the instrument and each test. Each test is described and advantages, limitations, sensitivities and specificities are given. For a copy of this document contact: Project Director, Health Technologies, *path*, 4 Nickerson Street, Seattle, Washington 98109-1699 USA or call 1-206-285-3500. The cost of the document is free to people living in developing countries.

Box Six—Program Recommendations for Women for Calcium, Zinc and Folic Acid

Supplementation		Fortification		Dietary Interventions	
Calcium	None recommended	Calcium	None recommended at this time	Calcium and Folic Acid	Promote improved intakes (See Boxes 7 & 9)
Zinc	None recommended at this time	Zinc	None recommended at this time		For folic acid, promotion should target newly married women or those not using modern methods of contraception
Folic Acid	250 mcg/day during pregnancy to meet increased needs for folic acid (500 mcg/day where anemia prevalence >20%)	Folic Acid	None recommended at this time		Promote proper cooking and preservation methods for folic acid: cook greens until just tender; dry foods in the shade to reduce loss (these methods also will prevent loss of other micronutrients or activity such as vitamin A)
	4 mg/day (1 month before conception through first trimester) for women who have delivered children with neural tube defects			Calcium and Zinc	Promote food processing (fermentation, germination and soaking staples) to reduce inhibitors in foods

Box Seven—Foods Rich in Calcium (mg/100g of Food)

Milk Products/Cheese	Vegetables	Others
yogurt (199)	dried seaweed (625)	tofu, fried (372)
goat milk (134)	amaranth leaves, cooked (209)	figs, dried, uncooked (144)
whole milk (119)	arugula, raw (160)	
parmesan cheese (1,633)	taro, cooked (149)	
goat cheese (895)	green soybeans, cooked (145)	
mozzarella cheese (646)	dandelion greens, cooked (140)	
feta cheese (493)	turnip greens, cooked (137)	
	spinach, cooked (136)	

Source: United States Department of Agriculture (1996). USDA Nutrient Database for Standard Reference, Release No. 11

Box Eight—Recommended Intakes for Calcium, Zinc and Folic Acid

Calcium		Zinc		Folic Acid	
Females 11-24 years	1,200 mg	Females, Non-Pregnant	12 mg	Women of Reproductive Age	0.4 mg
Females 25-50+ years	800 mg	Females, Pregnant	15 mg	Women at Risk for NTD *(1 month before conception through first trimester)*	4.0 mg
Pregnant	1,200 mg	Lactating, 1st 6 mos	19 mg		
Lactating	1,200 mg	Lactating, 2nd 6 mos	16 mg		

Source: United States Department of Agriculture (1996). USDA Nutrient Database for Standard Reference, Release No. 11

Box Nine—Foods Rich in Folic Acid (mcg/100g of Food)

Organ Meats	Legumes	Green Leaves	Others
chicken liver, cooked (770)	peanuts, raw (240)	seaweed kelp, raw (180)	raw beets (109)
beef liver, cooked (217)	cowpeas, cooked (208)	taro (160)	avocado (66)
	lentils, cooked (181)	spinach, cooked (146)	oranges (30)
	chickpeas, cooked (172)	kangkong (120)	plantains, cooked (26)
	black beans, cooked (149)	cowpea (110)	bananas (19)
		sweet potato (90)	orange juice (18)
		okra, raw (88)	dried dates (13)
		amaranth (85)	
		drumstick (37)	

Source: United States Department of Agriculture (1996). USDA Nutrient Database for Standard Reference, Release No. 11

Box Ten—Deficiency Cutoffs for Calcium, Zinc and Folic Acid

Calcium		Zinc		Folic Acid	
Males	<9.2mg/dL *(serum calcium)*	All Individuals	<70 mcg/dL *(serum & plasma)*	All Individuals	<3.0 ng/mL *(serum)*
Females	<8.8 mg/dL				<140 ng/mL *(erythrocyte)*
Pregnancy	<7.9 mg/dL				

Source: Gibson, R. (1990). *Principles of Nutritional Assessment.* Oxford University Press: New York.

Note: Cutoffs for calcium derived for normal ranges for these groups. Serum calcium values decrease with age in men.

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Reference Pullout

Box A

Early Observations of Calcium, Blood Pressure and Hypertensive Disorders of Pregnancy

In their work with river bank dwellers in New Guinea, Masironi, *et al.* (1976) saw a decline in blood pressure in the population as the calcium content of the river increased (cited in Repke and Villar, 1991). Belizán and Villar (1980) suspected that there might be a link between calcium and hypertension in pregnancy after observing Mayan women in Guatemala, who have a very low incidence of preeclampsia and eclampsia, soak their corn in lime before cooking it (cited in Carroli, *et al.* 1994). Women soak the corn to make it easier to remove the hulls and to soften the kernels before grinding them into masa (dough used to make tortillas). Soaking reduces phytate content of foods and increases the bioavailability of calcium and other minerals.

calcium. Because a first pregnancy is thought to be a risk factor for developing preeclampsia, the authors compared women in their first pregnancies with all other women and concluded that the results are generalizable to all pregnant women regardless of parity. The impact of calcium on delivery outcomes (preterm delivery, Cesarean section, IUGR, fetal death and perinatal death) also was examined, but there was not enough information to make any recommendations. The authors found that while calcium did show a protective tendency, the confidence intervals were too wide and sample sizes were too small to promote routine calcium supplementation for all pregnant women.

Commentary

Maternal morbidity and mortality due to hypertensive disorders of pregnancy are known in both industrialized and developing countries. Hypertensive disease was **the** primary cause of maternal deaths in the United Kingdom from 1988-90, accounting for 18.6% of all maternal deaths related to pregnancy, labor and the postpartum period (Depts. of Health–Wales, Scotland, Northern Ireland). In Africa, Asia, Latin America and the Caribbean, data from facility-based and community-based studies show that 10% of maternal deaths are associated with eclampsia (Duley, 1992). Hypertensive disorders occur most often in teenagers and women in their first pregnancy (Fadigan, *et al.* 1994). Other women at risk for are those with a history of high blood pressure, previous preeclampsia, multiple pregnancies and poor nutritional status, among others (Villar, *et al.* 1983; Moodley, 1993). The poor quality of care and absence of monitoring during pregnancy also put women at risk for hypertensive disorders of pregnancy; however, even with routine antenatal care and knowledge of the most common risk factors, hypertensive disorders of pregnancy are difficult to predict, prevent and treat because their cause is still not fully understood (Villar, *et al.* 1983).

The Carroli, *et al.* overview and the Bucher, *et al.* meta-analysis attempted to clarify the role of calcium in the prevention of hypertensive disease. These reviews included small studies that involved both primiparous and multiparous women who both were "at risk" and low risk for developing hypertensive disorders. Overall, the authors found that each individual trial was consistent in showing that calcium had a protective effect against PIH and other birth and delivery outcomes; however, because of the small sample sizes in each study, the authors did not recommend routine calcium supplementation for pregnant women. To determine if there is a true benefit of giving calcium to women during pregnancy, a larger supplementation study is needed. A recent calcium supplementation trial sponsored by the National Institute of Child Health and Human Development of the National Institutes of

Health (NICHD/NIH) is a large study that includes healthy, multiparous women from the "general population" (Levine, personal communication, 9-96). Preliminary evidence from this trial shows that supplementation had no effect on preeclampsia. Dietary calcium intake and urinary calcium data were collected at baseline from participants. This trial is the largest calcium supplementation study to date with over 4,000 multiparous, healthy, African-American, Latina and white women in the United States (Levine, Villar, personal communications, 9-96). Published results for this trial will not be available until early 1997 (Levine, personal communication, 9-96), but if these results are added to the meta-analysis on this subject, they would alter the outcome and conclusively show no effect from calcium supplementation (Villar, personal communication, 9-96). Nonetheless, questions raised by the NIH trial about the efficacy of calcium supplementation on preeclampsia should be reviewed based on letters to the editors and editorial comments after results are published.

Box B

Physiological Function of Calcium

Calcium is essential as a major structural component of the bones and teeth and for a number of specialized, regulatory functions including the proper contraction and relaxation of smooth muscle. Low calcium intake may stimulate the release of either parathyroid hormone or renin, thereby increasing intracellular calcium and the reactivity of vascular smooth muscle (Belizán, *et al.*, 1988). Villar and Repke, 1990, suggest that calcium deficiency may increase uterine smooth muscle contractility and cause preterm labor and delivery.

The results of the NIH trial are especially disappointing because calcium supplementation was one of only a few potential interventions to prevent women from developing preeclampsia. Low-dose aspirin supplementation was another proposed intervention, but results from a large trial found that aspirin had a non-significant effect on preeclampsia (CLASP, 1994). With no preventive measures for preeclampsia available, health workers can only assist women with this condition by helping them to manage it until delivery—the only known cure.

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What is the Relationship Between Zinc Status and Pregnancy Outcome?

T. Tamura and R. Goldenberg (1996). Zinc Nutriture and Pregnancy Outcome. Nutrition Research 16(1): 139-181.

Introduction

Zinc deficiency in humans has been associated with low birthweight (LBW), preterm delivery and obstetric complications. However, the relationship between zinc and pregnancy outcomes is not clear. Tamura and Goldenberg (1996) provide a comprehensive review of the research on the relationship between zinc and pregnancy outcome in an attempt to look at what is known about zinc and pregnancy and the questions that still remain.

Methods

The Tamura and Goldenberg overview includes research on zinc metabolism during pregnancy, dietary intake of zinc and other topics related to the association between zinc and pregnancy outcome. However, this MotherCare review article will focus on the nine zinc supplementation studies of pregnant women discussed by Tamura and Goldenberg. The results of these studies are organized here—but not by Tamura and Goldenberg—by three different groupings: women with sub-optimal zinc status (<70 µg/dL in fasting subjects, <60 µg/dL in non-fasting subjects, or values as defined by the authors) where dietary zinc intake is reported; women with sub-optimal zinc status where dietary zinc intake is not reported; and women whose zinc status was not determined and zinc intake may or may not have been reported.

Results

Women with sub-optimal zinc status /Dietary intake reported—

- ✦ In a randomized, case-control study, Goldenberg, *et al.* (1995) found that women given 25 mg zinc (recommended RDA is 11-15 mg/day) from 19 weeks gestation until delivery had babies with significantly higher birth weights (126g) than newborns of mothers given a placebo.
- ✦ In a randomized, double-blind trial, Cherry, *et al.* (1989) found that underweight and multiparous teenagers, receiving 30 mg of zinc/day, had infants with longer gestational ages (2.8 weeks longer) and significantly heavier babies (average of 362 g) than girls receiving no supplements. Girls with normal weights taking zinc had a 32% reduction in preterm delivery and their newborns had fewer respiratory problems.
- ✦ Hunt, *et al.* (1984) found that low-income, Mexican-American women who had received a daily vitamin supplement containing 20 mg of zinc starting at 19 weeks of gestation had a lower incidence of pregnancy-induced hypertension (PIH) than women who received a vitamin supplement with no zinc. There were no significant differences in birth weights among compliers in the two groups.
- ✦ In a similar study by Hunt, *et al.* (1985), Mexican-American teenagers were randomized at week 17 of pregnancy to receive either a vitamin supplement containing 20 mg of zinc or a vitamin supplement without zinc. There was no significant difference in birth weights between treatment and control groups and no decrease in the incidence of PIH. Zinc supplementation significantly reduced the number of girls with low zinc levels in late pregnancy.

Women with sub-optimal zinc status /No dietary zinc intake information—

- ✦ Simmer, *et al.* (1991) detected no significant difference in birthweights between the zinc supplemented group (22.5 mg/day) and the placebo group in their study of women in the United Kingdom. However, researchers did find a signifi-

cantly lower incidence of fetal growth retardation, Cesarean section, and induced labor in the zinc supplemented group. It was suggested that there was no impact on birthweight due to the small sample size of the study. Height, weight, weight gain, age, iron/folate supplementation and social class were controlled for the two groups.

- In a study by Jameson (1982), Swedish women with low plasma and serum zinc were randomized to receive 45 mg of zinc/day at 14 weeks gestation. Observations showed that 63% of women receiving zinc had normal blood pressure and hemoglobin, labor times of less than 20 hours, no proteinuria and normal blood loss (<300 ml), while only 48% of women without zinc and 55% of women with high serum zinc levels had these results. The author also observed that bleeding at delivery, the number of long labors and gestation and the number of postmature babies and Cesarean sections performed were all lower in the treatment group. Jameson did not report whether the differences were significant.

Zinc status not determined /Dietary intake reported or not reported—

- In a study in the United Kingdom, Mahomed, *et al.,* 1989, gave 20 mg zinc/day or a placebo starting at the 20th week of pregnancy to 494 women. There were no significant differences in pregnancy and birth complications, neonatal condition and the amount of leukocyte zinc concentrations in maternal blood and cord blood. The authors suggest that this is because the study population was relatively healthy, at low risk for pregnancy complications and had adequate zinc stores. There was no difference in dietary zinc intake between the two groups. Both groups were consuming only half of the recommended intake for zinc.
- Kynast and Saling, 1986, found that the 179 healthy German women given 20 mg of zinc/day had significantly fewer pregnancy and labor complications (premature separation of the placenta, preterm labor and vaginal bleeding), and less frequent large and small-for-date infants. Zinc-supplemented women had heavier infants than those women receiving a placebo; however, this difference was not significant. The authors did not provide any dietary zinc information.
- Ross, *et al.* (1985) examined the effects of giving zinc supplements (4.6-12.9 mg zinc/day) to Zulu women in South Africa. No dietary information was reported. Women who received zinc had, on average, infants who weighed less (3,088 g) than infants of women in the placebo group (3,171 g), but this difference was not significant. The authors suggest that the low birth weights in the zinc supplement group could be attributed to the lower body weights of the mothers (66 kg versus 71-73 kg) prior to supplementation. Zinc supplemented women gained less weight between 20 weeks and delivery than women in the placebo group (7.2 kg versus 8.8 kg). Also, the amount of zinc given may not have been adequate for this population.

Conclusions

While zinc supplementation has been associated with a number of positive birth and delivery outcomes, Tamura and Goldenberg conclude that these supplementation trials are **"mainly inconclusive due to inconsistent study conditions, insufficient sample size, and lack of specific and sensitive test(s) to accurately assess zinc nutriture."** The role of zinc supplementation in pregnancy and its impact on outcomes remain unclear. **The authors recommend that future research concentrate on developing sensitive and specific methods to assess zinc status, investigate the mechanisms of altered zinc metabolism during pregnancy and determine whether antenatal zinc supplementation leads to positive birth and delivery outcomes in a number of different ethnic groups.**

Commentary

Zinc is a trace mineral important to many enzymatic and non-enzymatic processes in the body. It is also a component of cell membranes and helps stabilize several entities and complexes within the cell. A number of clinical signs are associated with severe zinc deficiency, including growth retardation, delayed sexual maturation and impotence, epithelial lesions, anorexia, immune deficiencies, delayed healing, behavioral disturbances, poor taste acuity, dermatitis, absence or loss of hair and skeletal abnormalities. Because of its role in the maintenance and reproduction of cells, zinc is considered an important micronutrient for sexual reproduction and is vital for the developing fetus and young infant.

Although there is no good test to assess zinc status in humans, it is believed that many pregnant and lactating women (and consequently the developing fetus and newborn) in developing countries are at risk for zinc deficiency because their diets are low in absolute amounts of zinc and typically high in fiber and phytates that inhibit the absorption of zinc, particularly in maize and rice consumers (Gibson, 1994). Studies of zinc and pregnancy outcome in developing countries have been mainly observational, and there appears to be no conclusive findings to recommend that pregnant women receive zinc supplements. Currently, there are five maternal zinc supplementation trials in progress in Bangladesh, Chile, Ecuador, Indonesia and Peru (Caufield, personal communication, 6-96). Results from both developed and developing countries should be used to determine zinc requirements for pregnant women and the daily doses of zinc that pregnant women should take if they are at risk for zinc deficiency. What can be done to promote zinc intake in the meantime? Like iron, animal products provide the best sources of bioavailable zinc. Therefore, because of the cost of meat, advising women in developing countries to increase dietary zinc intake is probably not a viable option. A reduction in the interaction with phytates and competition with other micronutrients, such as iron pills, may be possible alternatives. **(See Box 6 of the center pullout).**

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Should Developing Countries Follow the USPHS/CDC Recommendations on Folic Acid to Prevent Neural Tube Defects?

R. Perez-Escamilla (1995). Periconceptional Folic Acid and Neural Tube Defects: Public Health Issues. Bulletin of PAHO 29(3): 250-263.

Introduction

Research over the last decade has provided convincing evidence that increased folic acid intake prevents recurrent and first occurrent neural tube defects (NTDs) (MRC Vitamin Study, 1991; Czeizel and Dudas, 1992). Neural tube defects are birth defects that occur when the embryonic neural tube, which forms the brain, spinal cord and spinal column, fails to close within 17-30 days gestation; thus, NTDs will occur before a woman knows she is pregnant and can take folic acid. NTDs are devastating defects that result in high mortality or a lifetime defect. The United States Public Health Service (USPHS)/Centers for Disease Control and Prevention (CDC) recommends that all women of childbearing age in the United States consume 0.4 mg/day of folic acid to help reduce the risk of NTDs and women with a previous NTD-affected pregnancy take 4 mg/day from one month before conception through the first trimester to help prevent the 2,500-3,000 NTD births occurring in the U.S. each year **(See Box 8 of the Center pullout insert)** (CDC, 1993). Fortification of the food supply is another strategy to increase folic acid intake in the general population. Breakfast cereals in the United States are already fortified with folic acid, and the U.S. Food and Drug Administration (FDA) enacted a rule that will require that specified grains be fortified with 0.43 mg to 1.4 mg of folic acid per pound, effective January 1998 (US FDA, 1996). Note: When this paper was written, fortification of grains was only proposed by the U.S. FDA. MotherCare editors have inserted the new FDA policy.

What do these programs and policies mean for developing countries that are currently working to reduce deficiencies in iron, iodine and vitamin A through supplementation and fortification schemes? Should developing countries also be implementing programs to address NTDs through folic acid supplements and fortification? R. Perez-Escamilla (1995) reviews the current research on this topic and discusses the relevance of folic acid supplementation and fortification in developing countries where women face many types of nutrition-related health problems and the majority of births occur outside the formal health care system.

Issues

Fortification

Fortifying certain foods with folic acid may be a cost-effective way to increase the folate consumption of women of childbearing age. Many developing countries already have the capability to fortify foods, but it is difficult to identify the appropriate food to fortify that is eaten by the most vulnerable groups. [A recent study on the cost-effectiveness of NTD prevention estimated that annual per capita costs of fortification for a U.S. adult population over the age of 15 are between $0.06-$0.15 (Kelly, *et al.,* 1996)]. Fortification has the potential to increase the folic acid intake of women before they conceive. Arguments against fortification are the possible risks to other groups, such as the elderly who are more likely to have vitamin B_{12} deficiency. Folic acid supplementation is often said to "mask" B_{12} deficiency because it corrects the pernicious anemia manifested by both folic acid and B_{12} deficiencies, but it does not correct the neurologic damage caused only by vitamin B_{12} deficiency. According to Perez-Escamilla, the U.S. FDA estimates that 13,000 people could be affected by folic acid fortification by obscuring the signs of B_{12} deficiency compared to the 1,000 cases of NTDs that would be prevented through fortification.

Selling good sources of folic acid in Papua New Guinea. Photo courtesy of MotherCare

have contact with the formal health sector. For women in some developing countries, the potential problems of confounders such as malaria and vitamin B_{12} deficiency make routine antenatal care (ANC) even more crucial; however, these women are less likely to receive adequate ANC. Finally, the cost-effectiveness of supplementing all women with folic acid to address a relatively rare health problem when there are so many other health-related issues in developing countries is questioned. Although it is believed that NTDs affect between 300,000-400,000 births each year, nearly 500 million people are affected by other nutrition-related health conditions such as anemia and goiter.

Another concern with fortification is the possibility of harmful interactions between folic acid and drugs such as anticonvulsants and others used to treat malaria.

Supplementation

Results from supplementation trials, observational studies and dietary intake studies have provided convincing evidence of an association between folic acid and the prevention of NTDs. Perez-Escamilla points out that despite these positive results, there are dosage questions, logistical issues and cost concerns that developing countries must consider when addressing this problem. Because most studies have been conducted in industrialized countries, it is not clear if the USPHS/CDC recommended doses for women with a previous or no previous NTD are appropriate for women in developing countries. In addition, the long-term effects of high dose folic acid are unknown. The protective effect of folic acid occurs early in pregnancy before the neural tube closes; therefore, women are advised to take supplements prior to conception and through the first trimester. This is logistically difficult, especially in developing countries where most pregnancies are not planned. The distribution of folic acid supplements through health facilities tends to exclude poor women who are less likely to

Increasing Dietary Intake

Increasing the amount of dietary folate may be a possible intervention for women who are at low risk of NTDs, although it may not be adequate for women who are at risk for a recurrent NTD. Dietary studies have shown positive associations between folate and the prevention of NTDs. Results from experimental studies suggest that the efficacy of unconjugated folic acid (as a supplement) is stronger than that of conjugated folate (occurring naturally as in foods). Therefore, women with a previous NTD-affected pregnancy may need supplements, but should be encouraged to increase dietary intake of folate as well.

Conclusions

Perez-Escamilla recommends that women who have had a previous NTD take folic acid supplements with guidance from a physician and that all women of childbearing age should be advised to increase their consumption of folate rich foods. Perez-Escamilla argues that developing countries that decide to adopt the USPHS/CDC recommendations for folic acid supplementation need to monitor pregnancy

outcomes and the safety of the suggested dosage. Finally, Perez-Escamilla concludes that widespread interventions in developing countries, such as fortification and supplementation of all pregnant women, are unnecessary due to the relatively small numbers of NTD cases and the potential health risks involved.

Commentary

Despite the strong evidence of the link between folic acid deficiency and NTDs, Perez-Escamilla discussed several reasons that the supplementation and fortification programs and policies of developed countries may not be appropriate for developing countries. Clearly, more research on folic acid supplementation addressing the specific issues in developing countries (e.g. dosage, malaria, B_{12} deficiency, interaction with other drugs) is needed. Nevertheless, folic acid is critical to women's health, especially pregnant women who are at greater risk for anemia. Inadequate stores of folic acid can contribute to the prevalence of anemia. The current recommendation from the World Health Organization (WHO) is that all pregnant women without anemia receive at least 0.25 mg of folic acid per day to meet the increased needs of the fetus. Nutrition education campaigns directed at women of reproductive age could help improve folic acid status before pregnancy. MotherCare recommends nutrition education to help women increase their intakes of dietary folate by eating foods rich in folate and by using protective food processing and cooking techniques. **(See Boxes 6 & 9 in the center pullout insert).**

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Program Approaches to Address Micronutrient Deficiencies in Women and Newborns

Program approaches for addressing micronutrient deficiencies are varied. For iron, fortification schemes to improve iron status of the general population are needed. It also may be possible, if infrastructures and budgets support this, to improve iron status by giving iron pills to non-pregnant women attending schools or in the places where they work. However, because of their high requirements, **women will still need to take iron pills during pregnancy to prevent anemia. These supplements can only be provided effectively by ensuring that enough pills are delivered to all pregnant women and that women take pills (See Box 1 in the center pullout insert).** At this time a daily dose is still recommended by the World Health Organization, and it is premature to change policies to reflect the weekly or intermittent iron dose theory. To improve iron status throughout the world, all causes of this deficiency should be addressed, particularly parasitic infections (e.g., hookworm). The World Health Organization now recommends that in areas where hookworm prevalence is high (>30%), pregnant women should receive presumptive treatment for hookworm infection in their second or third trimester[1].

Screening for anemia is not cost-effective where anemia prevalence is high and should never be used to target women to receive iron pills. It is more efficient to use money to provide enough pills for all pregnant women and for counseling materials to ensure compliance than to purchase screening supplies. However, it may be necessary to use screening tests and the appropriate cutoffs in certain settings (ie., women with danger signs during pregnancy or in surveys to evaluate program effectiveness). In these cases, the appropriate tests for hemoglobin and cutoffs for age, sex, pregnancy status and altitude should be used **(See Boxes 3, 4 & 5 in the center pullout insert).**

In areas where iodine deficiency is endemic, the fortification of salt with iodine is essential. This approach is being supported successfully by UNICEF. Less is known about the need for vitamin A supplementation in women of reproductive age, although USAID-funded studies in Nepal and Indonesia might help to make recommendations on the need for vitamin A supplementation during pregnancy in the near future. There is some information that vitamin A status of lactating women is poor in some countries. Until more is known about the impact of giving low doses of vitamin A during pregnancy, **newly delivered women should be given postpartum vitamin A supplements and messages to promote exclusive breastfeeding. Nutrition education to improve intakes of foods high in vitamin A activity in all women should be a priority.**

For calcium, zinc and folic acid, the program approaches in developing countries are less clear. From the literature reviewed, there is little conclusive evidence that calcium supplementation can affect hypertensive disorders of pregnancy. This is unfortunate since preeclampsia is one of the most difficult complications of pregnancy to reduce. However, calcium is still an essential micronutrient for all women of reproductive age, and women should be encouraged to consume adequate sources of foods containing calcium **(See Box 7 of the center pullout insert).**

There is more evidence that zinc deficiency negatively impacts on birth and delivery out-

[1]WHO (1995). Report of the WHO informal consultation on hookworm infection and anaemia in girls and women, 5-7 December, 1994. Programme of Intestinal Parasitic Infections, Division of Communicable Diseases, The World Health Organization.

comes but because the technology for measuring zinc status is so poor and cutoffs for deficiency are not well-established, **recommendations for programs to improve maternal zinc status are difficult to make at this time.** Moreover, very few dietary approaches exist for zinc because, like iron, good sources of zinc that the body can absorb are from animal products that are not affordable by most people in developing countries. What can be done to **optimize zinc and iron status alike is to minimize the competition between these two micronutrients by asking women to take iron pills, if they are well-tolerated, in between meals or before going to bed. Food processing techniques such as fermentation, germination and soaking that reduce phytates also may be promoted (See Box 6 of the center pullout insert).** This recommendation is particularly important in countries where maize, known to be high in inhibitors that can bind with both iron and zinc, is the major staple. Currently, there are five maternal zinc supplementation trials in progress in Bangladesh, Chile, Ecuador, Indonesia, and Peru. These studies will help establish better recommendations on program approaches to address zinc deficiency in women of reproductive age.

Actions to address the devastating effects of neural tube defects caused by folic acid deficiency are clearer than for zinc. There appears to be sufficient evidence to recommend folic acid fortification of certain foods in certain developed countries where the infrastructure and technology to do so exists. However, in developing countries more research is needed to determine the extent of the problem. In the meantime, however, **dietary approaches to increase intake of folic acid and improve the folic acid status of women living in developing countries are viable and should be encouraged. All women of reproductive age should be encouraged to eat foods that are good sources of folic acid to make sure they have adequate stores of folic acid before they conceive.**

A "MotherCare Program Essentials" insert on the micronutrients reviewed in this issue is included as a center pullout. This includes program recommendations for iron, calcium, zinc and folic acid **(See Boxes 1 & 6);** cutoffs and tests for hemoglobin (a measure of iron deficiency) **(See Boxes 3, 4 & 5)** and calcium, zinc and folic acid deficiencies **(See Box 10);** recommended intakes for iron **(See Box 2)** and calcium, zinc and folic acid **(See Box 8).** In addition, because the dietary approaches for calcium and folic acid are more viable than iron and zinc, **Boxes 7 & 9** show foods rich in these micronutrients.

Erin Dusch, Consultant,
and Rae Galloway, Nutrition Advisor

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MotherCare™ Matters

A QUARTERLY NEWSLETTER AND LITERATURE REVIEW ON MATERNAL AND NEONATAL HEALTH AND NUTRITION

A TRIBUTE TO JOSÉ LUIS BOBADILLA

(June 10, 1955 - October 2, 1996)

The loss of José Luis Bobadilla in a plane crash in October of 1996 has meant the loss of both a talented, skilled professional and a friend to the public health and development communities. Though only forty-one years of age at the time of his death, Bobadilla had already made an indelible mark in both arenas.

Born and raised in Mexico, José Luis Bobadilla attended medical school at the National Autonomous University of Mexico and received his doctorate in public health from the London School of Hygiene and Tropical Medicine. His dissertation research on the quality of perinatal care in Mexico City drew attention to the importance of quality of care as a determinant of perinatal mortality. Along with Dr. Julio Frenk, now Executive Vice President of the Mexican Health Foundation and Director of the Center for Health and the Economy, Bobadilla was a key player in the creation of the Center for Public Health Research (CPHR) of Mexico in 1984 and the National Institute of Public Health in 1987. Speaking about Drs. Frenk and Bobadilla, their colleague, Dr. Ana Langer, Regional Director for Latin America and the Caribbean at the Population Council, stated that with the success of both institutions, it is "fair to say that they started a new era of public health research and training in Mexico."

José Luis Bobadilla, with his son, Sebastián, Christmas of 1995.
Credit: Dr. Rafael Lozano

After serving as director of the CPHR from 1987 to 1991, Bobadilla accepted a position as a Senior Health Specialist with the World Bank where he worked until his move to the Inter-American Development Bank in March of 1996.

Doctor Bobadilla's contribution to public health and development began when, just out of medical school, he worked on defining Mexico's national health information system. Throughout his career, he retained an interest in data quality, particularly with regard to maternal and perinatal health. As part of his work on the *1993 World Development Report* of the World Bank, Bobadilla drew attention to the inadequacy of data from the developing world on perinatal mortality, prematurity, and low birthweight, making what Dr. Ron Gray, Deputy Chair and Professor in the Department of Population Dynamics at The Johns Hopkins School of Hygiene and Public Health called a

> ***"For two decades, he played a leading role in the creation of the foundations of modern public health in Mexico, Latin America, and the more than 50 countries he advised....The cause of public health policy all over the world has lost one of its most active and creative promoters."***
>
> *(In memoriam. José Luis Bobadilla Fernández. Salud Pública de México 38 (5):386-392, 1996)*

"very significant contribution by pointing out the deficiency of information and the need to rectify the situation."

More than Dr. Bobadilla's expertise in any one area, however, it was the scope of his achievements, the quality of his work, his commitment to development, and the congeniality of his approach that most impressed his colleagues and friends. "What really struck me," said Dr. Helen Saxenian, Principal Economist, Health, Nutrition, and Population, Human Development Department at the World Bank, "was how he was interested in so many different issues and countries."

José Luis Bobadilla was a prolific writer, and the breadth of his interests are reflected in his many publications, his research, and in his policy-oriented and programmatic endeavors. During his all-too-brief career, he focused on topics as diverse as the impact of quality of care on perinatal and maternal mortality and morbidity, and cost-effectiveness and resource allocation in the health sector of developing countries. With Julio Frenk, José Luis Bobadilla also played a pivotal role in elucidating the theories of the epidemiologic transition in Latin America and the health transition in middle-income countries. He was widely esteemed for his research savvy and intellectual honesty. He approached investigative work with a sense of humor, creativity and scientific rigor, focusing on solutions rather than problems and always questioning assumptions.

In addition to pursuing myriad research interests, José Luis Bobadilla was deeply committed to development. Toward that end, he brought his country-level and public health expertise to his work at the World Bank and to the many countries to which he provided technical assistance.

Colleagues who appreciated the breadth of his experience were doubly impressed by his unique ability to merge multiple worlds. Dr. Dean Jamison, Professor of Education and Public Health, and Director, Center for Pacific Rim Studies at the University of California, Los Angeles, worked closely with Dr. Bobadilla on the 1993 *World Development Report* and on editing *Disease Control Priorities in Developing Countries*. According to Dr. Jamison, Bobadilla was "a critical bridgehead between applied economics and the medical community....He carried the cost-effectiveness techniques into a whole larger domain. People in the health community became more comfortable with cost-effectiveness approaches because of his work and where he was coming from."

Bobadilla's capacity to integrate separate worlds extended to his work relationships. Reflecting on his spirit of collaboration, Julio Frenk—Bobadilla's colleague for 22 years—said, "he always combined friendship with the work relationship, which is not easy. He was a very effective collaborator. Often, the tension of work destroys a friendship but José Luis was so good at being able to mix two things: he was effective in work and a good friend."

Bobadilla also was a committed family man, which was evident to all who worked with him. "I have colleagues that seem like work is first," said Dr. Henry Mosley, Chair, Department of Population Dynamics, Johns Hopkins School of Hygiene and Public Health. "It was very different with José. He was extremely close to his family. His family was a part of his decision-making process regarding his career....He thought of what would be best for his family....There are relatively few colleagues that

> ***"This is a great loss. As a human being, he had that warmth, that depth of feeling, and an openness you don't find in a lot of people."***
>
> *(Henry Mosley, personal communication, 1997)*

give family equal priority or maybe even greater priority."

This issue of ***MotherCare Matters*** is dedicated to José Luis Bobadilla, whose premature death is a profound loss for the public health and development communities. In this newsletter and literature review, we abstract four publications representative of Dr. Bobadilla's work in maternal and perinatal health. In the first, *The Magnitude and Causes of Maternal Mortality in Mexico,* Bobadilla uses confidential inquiries to explore levels and causes of maternal deaths by type of health facility. The second, *Evaluation of Maternal Health Programs: Approaches, Methods and Indicators,* is a guide for selecting measures and methods for determining program success. In the final two, *Early Neonatal Mortality and Cesarean Delivery in Mexico City* and *Quality of Perinatal Medical Care in Mexico City,* Bobadilla presents findings from his doctoral work.

We offer this issue as a tribute to José Luis Bobadilla in the hope that those concerned with the health and well-being of families throughout the world will continue his good work with the same creativity, energy, commitment, and collaborative spirit that characterized all his efforts.

Nancy Nachbar, Consultant and
Marjorie Koblinsky, Director

Acknowledgments

The editors of ***MotherCare Matters*** acknowledge the contributions of many people who shared their insights on the life and work of José Luis Bobadilla. In particular, we thank Julio Frenk, Ron Gray, Dean Jamison, Ana Langer, Henry Mosley, and Helen Saxenian for taking time from their busy schedules to be interviewed. We extend our gratitude to Teresa de Mucha who responded to many requests for assistance with great efficiency. Finally, we thank Rafael Lozano, Rosendo Bobadilla and Lilia Fernández de Bobadilla for lending us photographs of José Luis Bobadilla.

The José Luis Bobadilla Memorial Fund for the Promotion of Public Health Policy

A Memorial Fund in Dr. Bobadilla's name has been established with the participation of the Inter-American Development Bank, the World Bank, the Pan American Health Organization, and the Fundación Mexicana para la Salud. From this Fund, two awards will be created, honoring excellence in the field of public health policy in Latin America and the Caribbean. One award will be for health policy research and the other for health policy program innovations. Both will be given biannually. Persons wishing to make contributions (tax-deductible) to the Fund may do so by sending a check payable to the Pan American Health and Education Foundation (PAHEF), a U.S. non-profit organization which has established a project in support of the Fund:

PAHEF
(Re: Bobadilla Fund)
525 23rd Street, NW
Washington, DC 20037

phone: 202-974-3416
fax: 202-974-3658
email: marksrick@paho.org

The Magnitude and Causes of Maternal Mortality in the Federal District (1988-1989)

José Luis Bobadilla, Sandra Reyes Frausto, and Samuel Karchmer (1996). Gaceta Médica de México. 132(1):5-18.

Introduction

High rates of maternal mortality typically are found in poor societies characterized by high rates of infectious diseases and inadequate attention to proper care for women and children during reproduction and growth. Given large social inequalities in Mexico, maternal mortality remains high in rural areas, but has declined in cities, where living conditions and access to health care have improved. Paradoxically, however, the maternal mortality ratio in Mexico City remains high at 6.6 maternal deaths per 10,000 registered live births in 1986, according to statistics of the Secretary of Health. Even this number probably is an underestimate.

The aim of this study, conducted over 18 months in 1988-1989 was to: (1) determine the magnitude of maternal mortality in Mexico City; (2) examine differences in maternal mortality among three types of hospital settings; (3) determine the leading clinical causes of death; and (4) identify aspects of medical practice that contributed to the death of a woman from a pregnancy-related complication.

Methods

The study population included all women of childbearing age (defined here as 12-49 years of age) who had died from maternal causes in Mexico City during the 18-month study period. After reviewing death certificates of women of reproductive age from 40 civil registry courts in Mexico City, Bobadilla and his colleagues identified confirmed maternal deaths, possible maternal deaths, and non-maternal deaths.

Deaths were classified as maternal if they occurred during pregnancy or within one year of termination,[1] or if they were caused by any factor related to or aggravated by the pregnancy or care received. Maternal deaths were categorized as direct or indirect. Direct obstetric deaths were those related to complications of pregnancy, labor, delivery, or the puerperium. Included in this category were deaths resulting from interventions, omissions, or incorrect treatment. Indirect obstetric deaths were those resulting from a condition that predated the pregnancy, developed during it, or was aggravated by the physiological effects of pregnancy or delivery.

Trained nurses visited families of those women categorized as having experienced a possible maternal death to determine whether the woman may have been pregnant at the time of her death or within the last year of her life, and to learn the place of death and gather information on other variables, such as access to health services and type of treatment received.

Study staff collected information on characteristics of forty-four hospitals in four health sector institutions: the Ministry of Health (SSA), the Mexican Institute of Social Security (IMSS), the Social Security Institute of Government employees (ISSSTE), and the City's Health Services Department (DDF). Information on the maternal deaths (e.g., admissions, discharges) were collected by hospital, including

[1]N.B., The definition of a maternal death differs from that in the International Classification of Diseases (ICD-9), which was the version in use during the study period. In the ICD-9, as well as in the ICD-10 currently in use, maternal deaths are classified as those occurring within forty-two days of pregnancy termination.

photocopies of lab reports and files of maternal death cases. A Maternal Mortality Committee, composed of professionals from several specialties (obstetrics, pathology, anesthesiology, epidemiology, and others) reviewed medical records to ascertain the clinical cause of death, identify the conditions associated with the death, and assign responsibility for the death.

Table 1—Preventable Maternal Deaths by Responsibility and Type of Health Institution, Mexico City, 1988-89

Health Institution Type[2]	Total Deaths	Doctor (%)	Facility (%)	Patient (%)
A1	68	92.8	16.2	36.9
A2	33	81.8	33.3	38.4
B1	79	79.7	7.8	10.1
B2	25	68.0	16.0	12.0
Total[3]	**205**	**82.9**	**15.6**	**21.5**

Adapted from Bobadilla et al., 1996

Results

Of the 433 maternal deaths identified by the study investigators, only 238 had been reported through routine analysis of the death certificates by the National Institute of Statistics, Geography, and Informatics. This indicates a 45 percent underestimation of the maternal mortality ratio. Eighty-five percent of the underestimation resulted from incorrect coding or improper completion of the cause of death section on the death certificates. Underregistration of maternal deaths accounted for just seven percent of the underestimation.

There were significant differences in the magnitude of underestimation depending on where the death occurred. The Mexican Institute of Social Security (IMSS) had a statistically significant higher rate of underestimation than institutions from other health sectors.

Four out of five maternal deaths studied occurred in public assistance or Social Security institutions while the rest occurred in private hospitals or homes. When the authors compared the corrected maternal mortality ratios in Social Security facilities with those in public assistance agencies, they concluded that the probability of dying during pregnancy, labor, or puerperium was lower in the former than in the latter.

Almost all (87 percent) of the maternal deaths studied were classified as resulting from direct obstetric causes. Of these, more than one-third (thirty-five percent) resulted from hypertensive diseases of pregnancy. Hemorrhage accounted for nearly one-quarter (22 percent) and infection accounted for almost one-fifth (17 percent) of all deaths. Abortion accounted for 10 percent of the deaths. Thrombosis and iatrogenesis (i.e., death from administration of anesthesia) accounted for 6 percent and 4 percent of the remaining direct obstetric deaths respectively.

When cause-specific mortality ratios were calculated by health facility type, differences emerged. **For hypertensive disorders of pregnancy, women who went to the Ministry of Health (SSA) facilities had a statistically significant higher risk of dying than women with the same condition attending other facilities. For infection, the differences in the maternal mortality ratio were even greater between facilities, with women presenting with infection to an SSA facility having a statistically significant higher risk of dying than those presenting at other facilities.**

Case files of 240 maternal deaths occurring in the Social Security and public assistance facilities were investigated to determine which deaths were preventable and to assign responsibility for the deaths among three

[2]A1 and A2 = public assistance; B1 and B2 = Social Security

[3]Since responsibility may not have been assigned or may have been assigned to more than one category, sum percentages for each institution may not equal 100.

possibilities: physician, hospital, or patient. A summary of preventable maternal deaths by institution type and assignment of responsibility appears in Table 1. **In all hospitals, more than three-quarters of the deaths (82-94 percent) were considered preventable, with responsibility for the death assigned to the physician in a majority (68-93 percent) of these cases.** Responsibility for a death was more commonly assigned to the physician if the death occurred in a public assistance hospital than if it occurred in a Social Security hospital. **In all institutions, physician responsibility for maternal deaths far overshadowed hospital or patient responsibility because most of the preventable maternal deaths involved a clinical or surgical misjudgement or mistreatment.** Nearly a third of the deaths were due to incorrect therapeutic decisions—most commonly causing aggravation of a moderate complication. Improper performance of surgery or the decision to operate when there was no need were the most common surgical misjudgements that caused one-quarter of the deaths. Types of physician errors are summarized in Table 2.

Table 2—Types of Physician Errors Involved in Preventable Deaths, Mexico City, 1988-89

Type of error	Number	Percent
Wrong therapy	52	30.8
Surgical judgement error	40	23.5
Diagnostic error	33	19.4
Late treatment	9	5.3
Anesthesia administration error	3	4.7
Poor prenatal care	5	2.9
Other	30	17.8
Total	**170**	**100.0**

Adapted from Bobadilla et al., 1996

In one in six cases where responsibility for the maternal death was assigned to the hospital, it generally was because of scarcity of resources or lack of laboratory or physician services. Among those cases where responsibility was assigned to the patient (22 percent), the most common problems were late presentation for prenatal care or lack of compliance with therapeutic recommendations.

In their discussion, the authors conclude that the maternal mortality ratio of 11.4 per 10,000 in Mexico City is very high when compared to other countries at similar levels of development and is at least 10 times that found in the United States or Canada. **The degree of underestimation (45 percent) of maternal deaths also is exceptionally high and determined to originate with problems in the health services themselves rather than with the processing of statistics.** Bobadilla and his colleagues conclude that the results of this study indicate serious inadequacies in the obstetric care provided at public assistance and Social Security hospitals.

Further, based mainly on findings from the current study, the authors list problems within the Mexican health system that contribute to maternal mortality. Among these are: inefficient resource allocation, inadequate staff supervision, inadequate or nonexistent protocols for managing complications, poor hospital planning, deficiencies in the referral system, and a lack of maternal mortality committees in hospitals.

Commentary

Retrospective inquiries into maternal deaths can yield critical data on major deficiencies in the quality of health care (Donabedian, 1988). Bobadilla and his colleagues found that grave problems in physician care was the most significant factor contributing to a maternal death. Similar results were found in the National Maternal Mortality Study of Egypt: 1992-1993 (Ministry of Health, 1994).

The one-year study of maternal deaths in Egypt was conducted by the Child Survival Project of the Ministry of Health along with the Central Agency for Public Mobilization and Statistics (CAPMAS). Data were collected from a random sample of 122 health bureaus in 21

governorates, excluding the five frontier governorates which comprise only 1 percent of Egypt's total population. Health bureaus were asked to report all deaths of women of reproductive age for one year, beginning in March of 1992. Maternal deaths among these were identified first by a screening questionnaire at the health bureaus and second by interviews with the deceased women's relatives. In addition, all questionnaires and records were reviewed at the governorate level by advisory groups of physicians who assigned causes of death and determined avoidable factors.

Nearly all (92 percent) of the maternal deaths were determined to have been preventable. In nearly half (47 percent) of these, errors in diagnosis and management by the obstetric team were found to be a contributing factor leading to a maternal death.

As the Egyptian study and the one conducted by Bobadilla and his colleagues demonstrate, confidential inquiries can provide information on aspects of the care-giving process that went awry and therefore contributed to a maternal death. At the same time, this investigative technique has limitations. It requires competent specialists to conduct the review and a sufficient number of maternal deaths to investigate.

In addition, while retrospective reviews of maternal deaths can yield valuable information on serious deficiencies in care, they are unlikely to capture more subtle problems (Donabedian, 1988). For example, Donabedian defines two levels of practitioner performance: technical and interpersonal. Interpersonal communication is "the vehicle by which technical care is implemented and on which its success depends." (Donabedian, 1988). Furthermore, clients' perceptions of the quality of interpersonal communication can influence their satisfaction with care and affect their use of health services (DiMatteo, 1994). Observations of client-provider interaction may be the only means of capturing information on this dynamic.

Another problem concerns the medical record itself. Though it serves as the primary source of information in retrospective reviews of maternal deaths, it has limitations. It often

"We shared an interest in perinatal and maternal health and in the quality of information, especially statistics on maternal health."

(Ana Langer, personal communication, 1997)

is incomplete, inaccurate, and provides information only on care received in the hospital (Donabedian, 1988). Some of these weaknesses may be overcome by procedures such as those adopted by Bobadilla and his colleagues. They supplemented reviews of medical records with pathology reports and interviews with families of those women initially classified as having experienced a possible maternal death to learn about previous health problems and health services utilization. Other techniques to address weaknesses in the medical record include recoding diagnostic categories and interviewing or administering questionnaires to practitioners (Donabedian, 1988).

When retrospective reviews are conducted in a methodologically sound manner, care still must still be taken in how data are interpreted. For example, in their confidential inquiry, Bobadilla, et al. report cause-specific maternal mortality ratios by health facility and assess quality accordingly. However, numbers of maternal deaths by cause are likely to be small for one year and probably vary a lot over the years. Additionally, there is no control on admission status (e.g., severity of condition on admission). Unless admission status is controlled for and maternal deaths are in significant numbers, the number of maternal deaths by cause probably is not a useful indicator for comparison of quality among institutions.

Finally, confidential inquiries are less useful in settings where many births occur outside of hospitals. In Mexico City, about 90 percent of all deliveries are assisted in hospitals (Secretaria de Salud, 1989). In settings where the percent is substantially lower, in-hospital maternal deaths will represent a smaller proportion of the total number of maternal deaths. In these situations, while confidential inquiries may provide evidence of deficiencies

in the quality of care in hospitals, the results may not be generalizable.

Notwithstanding the limitations of confidential inquiries, this investigative technique also has many strengths. It can be used to yield important information on care-giving processes, to determine the major causes of maternal deaths, and to help direct intervention strategies.

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Evaluation of Maternal Health Programs—Approaches, Methods and Indicators

José Luis Bobadilla (1992). International Journal of Gynecology and Obstetrics 38(Suppl): S67-S73.

Introduction

Many countries have initiated programs to reduce maternal mortality and morbidity. However, few such programs have documented success. Most have not been evaluated or have used inappropriate evaluation approaches or methods. Additionally, measuring the impact of maternal health interventions often is difficult, even under optimal conditions. For these reasons, individuals concerned with maternal health face the challenge of defining appropriate approaches to maternal health program evaluation.

In this paper, successful approaches to evaluation of programs aimed at maternal mortality reduction are discussed, available methods are critiqued, and useful indicators for assessing maternal health interventions are outlined.

APPROACHES TO PROGRAM EVALUATION

- ✦ Define program characteristics
- ✦ Define the dimension(s) to be evaluated, e.g., coverage, equity, quality of care, women's satisfaction with care, efficiency, cost-effectiveness
- ✦ Define the standard(s) for comparison

Approaches to Program Evaluation

The purpose of program evaluation is to gauge program quality. Therefore, evaluators must define the *characteristics of programs,* the *dimension* (e.g., coverage, technical quality) to be evaluated, and the *standard(s)* against which a comparison will be made.

Program evaluations often fail because the intervention itself is poorly defined. Since maternal health programs generally are broad in scope, with a range of anticipated outcomes, they should be defined in terms of provider, setting, activities, interventions, and most critically, outcomes.

There are six dimensions of a program that should be evaluated because they are relevant to the intervention's success. These are: coverage, equity, quality of care, women's satisfaction with care, efficiency, and cost-effectiveness. Bobadilla defines **coverage** as the proportion of the population that has 'reasonable access' to the health program in question. He acknowledges the importance of familial, cultural, and individual influences in the decision to seek care. He also points to a central role of the amenities in determining health services utilization, its content, and the way emotional needs of women are addressed.

While **equity** has been defined in many ways, it generally refers to 'the distribution of resources according to the health needs of the population.' (p. S68). Coverage of the most needy socioeconomic groups may be a key to equity.

The technical **quality** of health care services rendered is what determines the contribution of health care in altering health status. Key elements of technical quality include the delegation of responsibility (largely determined by training and performance), the amount and appropriateness of available resources and technology, and performance at accepted standards of care.

Another element of quality of care is the degree to which health providers respond to the emotional needs of women and their families. This concept is captured in the dimension of **women's satisfaction with care,** which—because of its importance—is highlighted as a dimension in its own right, distinct from quality of care.

Efficiency is defined as the amount of resources that go into a program in relation to the amount of output. The three dimensions of efficiency, quality of care, and coverage are included in the concept of **cost-effectiveness,** which is the most comprehensive dimension for measuring a health program.

Once measurable dimensions are defined, they must be **compared against some standard.** Standards can be theoretical or empirical. Theoretical standards may be appropriately applied when the relationship between inputs and outputs is known and when the context is generally applicable. Where the relationship between inputs and outputs is unknown, empirically derived standards (i.e., "best possible" outcome and "best achievable" outcome) must be used. The "best possible" standards stem from randomized clinical or community trials. However, because they derive from such controlled environments, they generally cannot be applied (for logistic or ethical reasons) to most settings in which maternal health programs operate. The "best achievable" outcome is the more meaningful empirical standard. This criterion is set according to outcomes obtained by comparable interventions operating in similar settings.

Cost-Effectiveness

In the *1993 World Development Report,* cost-effectiveness (in health care) is defined as the "net gain in health or reduction in disease burden from a health intervention in relation to cost." (World Bank, 1993)

Cost is determined largely by coverage, resource efficiency, and intervention complexity. Effectiveness depends on coverage, efficacy, and quality of care

Cost-effectiveness has been proposed as the criteria by which developing country governments set health intervention priorities.

By defining the program according to intervention type (e.g., single intervention, package of interventions) and by selecting the dimensions to be evaluated and the standards to be used, more than 90 possible approaches for evaluating maternal health program emerge. The elements of these approaches are summarized in Table 1 on the following page.

Methods of Program Evaluation

Given that **effectiveness** is the primary program outcome of interest, there are many methods leading to its evaluation: randomized clinical trials, randomized community trials, quasi-experiments, observational studies, and confidential inquiries. **Randomized clinical trials** are considered to be the gold standard, but they have limitations. For ethical reasons, they can be used only when the benefits of the intervention are in doubt. Moreover, they are most suitable for single interventions. **Randomized community trials** are useful for evaluating the absolute efficacy of a package of interventions whose efficacy is unknown. However, they may be very costly and difficult, because of the need to find comparable communities that will yield a sufficient sample size. **Quasi-experimental studies** are the most common type of evaluations. In this design,

Table 1—Evaluation of Maternal Health Programs: Elements for Consideration

Program	Dimensions	Standard
Single intervention	Coverage	Theoretical
Package of interventions	Equity	Best possible
Integrated program	Quality of care	Best achievable
Groups of programs within a health institution	Women's satisfaction	
All programs of the health system	Efficiency	
	Cost-effectiveness	

Adapted from Bobadilla, 1992

two or more groups are selected to participate. One group receives the experimental intervention and the other usually receives another intervention with known effectiveness. In both groups, outcome measures are taken before and after program implementation, allowing for calculation of the absolute change.

Observational studies are not an acceptable method for program evaluation unless a case-control approach is used. Randomly selected individuals who have experienced negative health outcomes generally are considered cases and those who have not experienced a negative outcome serve as controls. Both groups are assessed in terms of their exposure to the program of interest. Case-control observational studies are the appropriate method to use when evaluations must be conducted on programs that already have been implemented. While case-control observational studies are inexpensive, they can be difficult to conduct. It often is hard to select a representative sample of controls and to account for all possible confounding variables.

When **confidential inquiries** into maternal deaths are conducted, the measure of effectiveness is a proportionate mortality ratio of preventable maternal deaths (i.e., the number of such deaths in a given time period over the total number of maternal deaths in the same time period). Often, this ratio is compared to that of a previous time period (1-3 years). The major advantage of a confidential inquiry is that it provides useful process indicators (i.e., it gives information on the factors that contributed to a maternal death), such that changes can be made. It also is inexpensive compared to some of the other study methods. However, because maternal deaths are a relatively rare event, this method may not be suitable for small programs, unless a severe maternal morbidity is used as the outcome of interest. Also, to adequately perform a confidential inquiry, specialists in obstetrics, internal medicine, and pathology often are required but may not be available in all settings.

Indicators for Evaluating Effectiveness of Maternal Health Programs

Three types of indicators should be used for evaluation: structure, process, and outcome. Structure indicators assess, in quantitative and qualitative terms, the available resources and the organizational arrangements (e.g., staffing, supplies) that make them work. Since structure indicators give background information, they can help explain why a program may have failed to produce a desired outcome.

Measurement Concerns

Outcome indicators are of critical importance but suffer from many deficiencies. The maternal mortality ratio (MMR) has well-documented shortcomings, namely the large sample size needed to be able to obtain enough maternal deaths, and the low sensitivity of the measure to capture quality of care. Bobadilla states that "little has been done to improve the shortcomings of the maternal mortality ratio" (p. S72). Because the MMR has serious limitations, it is preferable to work with indicators of morbidity. However, if mortality truly is the outcome of interest, the morbidity indicator selected must be one with a clear association to the disease condition of interest.

Summary of Methods

Randomized Clinical Trials

(Most suitable for single intervention)

- **+ Gold standard**
- **- Can be used only when efficacy of intervention in doubt**

Randomized Community Trials

- **+ Useful for evaluating efficacy (if unknown) of intervention packages**
- **- Costly, difficult**

Quasi-experimental Studies

- **+ Two groups, one with intervention, one without**
- **+ Pre-post design**

Observational Studies

- **+ Useful (if case-control) when evaluating program that already has been implemented**
- **+ Inexpensive (if case-control)**
- **- Unacceptable unless case-control approach is used**
- **- Case-control difficult to conduct**

Confidential Inquiries

- **+ Gives useful process indicators**
- **+ Inexpensive**
- **- Demands availability of specialists from many disciplines**
- **- Inappropriate for small programs**

Commentary

Ever since the Safe Motherhood Initiative was launched in 1987, public health leaders, program managers, and researchers alike have wrestled with the problem of program evaluation. In the last decade, two major forces have shaped this struggle: measurement challenges and an evolving vision of maternal health in which integrated services are provided in an effort to ensure reproductive health.

Much has been written about the difficulties in measuring the impact of Safe Motherhood programs on reducing maternal mortality (Graham and Airey, 1987; Graham et al., 1996; Royston and AbouZahr, 1992). In sum, measurement problems include: first, the small numbers of maternal deaths due to the relative rarity of this event and under-reporting of maternal deaths, both generally and by cause; and second, the general necessity of evaluating a program in 2-5 years.

The need to address these measurement challenges has shaped approaches to maternal health program evaluation. If maternal mortality is used as an outcome indicator, maternal deaths must be assessed directly, not using the indirect sisterhood method which estimates the MMR for a point in time approximately 12 years prior to the survey date.[1] The MMR needs to be current, with deaths included only for the period of years of intervention. A baseline also is needed, matched by a similar period of time. Given that mortality generally cannot be used, the obstetric complications that lead directly to maternal deaths are the next best "outcome" measure.

The need for better information on women's perception of major obstetric complications (e.g., hemorrhage, obstructed labor, puerperal sepsis, and eclampsia) provided one rationale for conducting studies to validate women's self-report of these problems. Preliminary results of the validation studies indicate that in large-scale surveys, however, **women's retrospective self-report of obstetric complications is not an accurate means by which to estimate the proportion of women needing medical treatment for a specific obstetric problem** (See *Statement from a Task Force Meeting on Validation of Women's Reporting of Obstetric*

[1]Demographic and Health Surveys generally employ the direct sisterhood method, which provides estimates for shorter time periods. However, because confidence intervals for the estimates are so wide, reporting annual maternal mortality rates or ratios is inappropriate (Stewart MK, personal communication, 1997).

> ***"Since the start of his career, he [José Luis Bobadilla] dedicated himself to measuring and analyzing health needs, especially those of women and children..."***
>
> *(In memoriam. José Luis Bobadilla Fernández. Salud Pública de México 38 (5):386-392, 1996)*

Complications in National Surveys immediately following this article).

Through larger-scale surveys, it is possible to obtain information on women's health-seeking behavior upon experiencing a perceived problem. As a measure, this information translates into the number of women who use services with a perceived problem divided by the total number of women with a perceived problem. However, as seen from the validation studies, this indicator is not sufficient for the purpose of program evaluation since women overestimate the actual level of complications (Task Force on Validation Studies, 1996).

It is now obvious that complications must be diagnosed by a trained clinician to provide a valid indication of a complication experienced. To collect this information, registers must be in the hands of providers likely to see complicated cases (at a health care facility or in outreach programs). Additionally, quality assurance mechanisms must be implemented to ensure appropriate and timely completion of registers.

The Challenge of an Expanding Vision of Maternal Health

The other significant force affecting evaluation has been a philosophical shift within Safe Motherhood programs. When first launched in 1987, the Safe Motherhood Initiative's (SMI) primary aim was to reduce the unacceptably high levels of maternal mortality. Over the last decade, the goals of the SMI and of the many interventions it spawned have expanded. Recognizing that death is the "most extreme outcome of reproduction for women"(Graham and Campbell, 1992), public health advocates have broadened their approach to encompass the "four other D's—disease, disability, discomfort, and dissatisfaction" (Graham and Campbell, 1992).

Furthermore, the Programme of Action endorsed at the International Conference on Population and Development held in Cairo in 1994 and reconfirmed at the Fourth World Conference on Women in Beijing in 1995 explicitly states that programs to reduce maternal mortality and morbidity should provide access to expanded reproductive health services (United Nations, 1994). Beyond the provision of adequate delivery assistance and appropriate management of obstetric complications, an integrated approach demands the provision of family planning, nutrition services and counseling, post-natal and neonatal care, and the prevention/management of sexually transmitted diseases, including HIV/AIDS. This expanded approach means that Essential Obstetric Care (EOC) and its subset, Emergency Obstetric Care, are now considered only one of the four pillars to improve women's reproductive health through basic maternity care. The other three pillars are: family planning, antenatal care, and clean/safe delivery, as espoused in WHO's Mother-Baby Package (WHO, 1994).[2]

The provision of services in these areas is consistent, not just with efforts to reduce morbidities and mortalities, but with a vision of reproductive wellness where "reproductive health is a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity, in all matters relating to the reproductive system and to its functions and processes" (United Nations, 1994). As a result of this philosophical shift, maternal health programs now have an even broader scope and multiple objectives. This, in turn, raises new challenges for evaluation.

Addressing the Evaluation Challenge

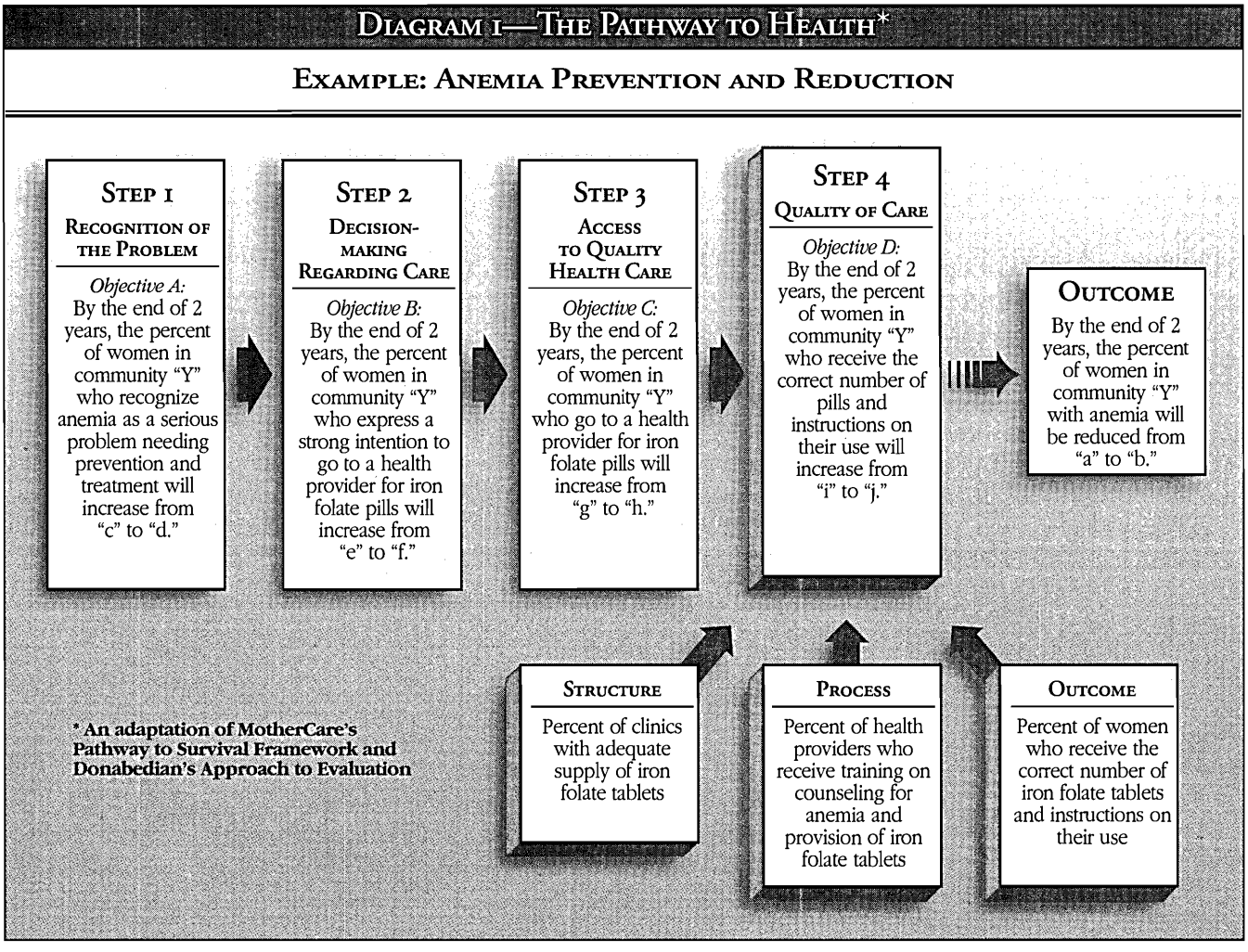
Understanding the need to collect information on structure, process, and outcome variables that reflect the expanded scope of maternal health and reproductive health efforts, program

[2]Another important pillar of these programs is attention to post-partum and newborn care.

managers have struggled to determine and define appropriate indicators.

The approach delineated by Bobadilla provides a framework by which to guide the choice of indicators and the methods used to gather the data. Other frameworks also may be used to direct indicator selection. For example, MotherCare uses the Pathway to Survival as the framework for defining intervention strategies (see *MotherCare Matters* vols. 5(1) and 5(4)). The Pathway delineates steps that may determine the survival of a woman or her newborn when they experience a potentially life-threatening obstetric or neonatal complication. The Pathway has four steps: (1) problem recognition; (2) decision-making regarding care; (3) access to care; and (4) quality of care obtained. Though originally conceived for mortality prevention, the framework also can apply to preventing morbidities.

The four steps in the Pathway can guide the selection of program objectives and evaluation indicators. As an example, the overall goal in anemia prevention and reduction might be: By the end of two years, the percent of women in community Y with anemia will be reduced from "a" to "b." Specific objectives might be: By the end of two years, the percent of women in community Y who: (A) recognize anemia as a serious problem needing prevention and treatment will increase from "c" to "d" (problem recognition); (B) express a strong intention to go to a health provider for iron folate pills will increase from "e" to "f"[3]; (C) go to a health provider for iron folate pills will increase from "g" to "h" (access to care); (D) receive the



[3]In an unpublished paper, Fishbein and colleagues wrote, "...the intention to perform a given behavior is one of the immediate determinants of that behavior. The stronger one's intention to perform a given behavior, the greater the likelihood that the person will, in fact, perform the behavior" (Fishbein et. al., 1991).

correct number of pills and instructions on their use will increase from "i" to "j"(quality of care); and (E) report taking an adequate dosage of iron pills during pregnancy will increase from "k" to "l" (The Evaluation Project, 1995). (See Diagram 1 on page 13.)

Once program objectives are clearly articulated, appropriate structure, process, and outcome indicators must be selected. (Donabedian, 1988). Continuing with maternal anemia reduction as an example, possible structure, process, and outcome indicators for *Objective D* are: (1) percent of clinics with adequate supply of iron folate tablets (structure); (2) percent of health providers who receive training on counseling for anemia and provision of iron folate tablets (process); and (3) percent of women in community Y who receive the correct number of iron folate tablets and instructions on their use (outcome).

Conclusion

The struggle to find appropriate indicators for evaluating maternal health programs and—now more broadly—reproductive health programs, continues. From the example above, it is evident that there are many possible approaches to evaluating maternal health care programs. As those concerned with maternal health rise to the challenge of measuring their efforts, frameworks, such as the one proposed by Bobadilla, are useful in guiding program evaluation.

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Statement From a Task Force Meeting on Validation of Women's Reporting of Obstetric Complications in National Surveys

On September 16 and 17, 1996, a task force meeting, organized by the MotherCare Project and the Demographic and Health Surveys (DHS) Program, was held to review results of six studies seeking to validate women's self-reporting of major obstetric complications. A major goal of the meeting was to determine, as a group, the usefulness of asking women questions on signs and symptoms of obstetric complications using survey methods. As a group we agreed that four postulated uses of such data would include: 1) estimating the population prevalence of these complications; 2) identifying women who needed medical evaluation; 3) identifying women who perceived they had a problem; and 4) studying women's reported behavior in the context of a perceived problem. Knowledge of the validity of women's reporting of complications is most relevant for the first two of these objectives.

Conclusions

1. The focus of these studies was on broad categories of maternal complications including dysfunctional labor, hemorrhage, sepsis, and eclampsia. Estimations of the population prevalence of these problems, based on interview data collected in national surveys, are not likely to be valid (e.g., accurate when comparing self-report with medical records) or reliable. Estimations based on data from in-depth, more focused community studies may be more accurate. (See no. 4 under general findings below.)

2. In large scale surveys, women's retrospective self-report of complications is not an accurate means of estimating the proportion of women who needed medical treatment for obstetric complications.

3. It is possible and useful to ask about women's perceived problems if questions on health care seeking are also asked. The main objective of this line of questioning is to learn about health care seeking behavior in the context of a perceived problem. Because such results would be interpreted in the context of the woman's perception that she had a problem rather than as a medically defined problem, validation of reporting would not be necessary. The resulting indicator proposed would be:

$$\frac{\textbf{Women who sought care}}{\textbf{Women with a perceived problem}}$$

Such an indicator would not be sufficient for the purpose of monitoring safe motherhood programs. There is a strong need to explore other indicators, such as coverage of obstetric care, which may better capture changes in access to and quality of essential obstetric care.

4. The context of data collection should be considered in assessing the usefulness of data obtained. In this light, community surveys differ from nationally representative surveys in ways that might affect both the validity and reliability of responses. For example, in large-scale surveys conducted in countries with multiple languages and ethnic groups, time and financial resources often pose significant constraints. These constraints make it less feasible to conduct the in-depth qualitative research that is needed in each language and culture group to assure appropriate conceptualization, wording, and translation of questions for a standardized questionnaire. In addition, large sample sizes often necessitate the employment of many interviewers which complicates training and supervision of data collection in ways that prevent the required degree of attention to detail. And

continued

in multi-purpose, DHS type surveys, many widely varying subjects are covered in the questionnaire, thus limiting the time allowed for special training on any one topic.

Implications

1. Data from national surveys should not be used to indicate whether women who had a medically defined complication are seeking medical care. Such surveys are thus more worthwhile if focused on knowledge, behavior, and perceptions.

2. The standards applied here to the study of obstetric complications in surveys are somewhat higher than has been used in the past for some other types of morbidity. Justification for this more rigorous approach is based on our desire to avoid the use of indicators that are likely to give an inaccurate picture of program impact. Based on the preliminary results of these studies we believe, in general, that women's reporting of obstetric complications in large scale surveys should not be the basis of indicators of program failure or success.

Finally, we would note that this statement is based on the preliminary findings from these studies and that more in-depth insights will be forthcoming when the final results are published.

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SECTION TWO

PERINATAL HEALTH AND SURVIVAL

Early Neonatal Mortality and Cesarean Delivery in Mexico City

José Luis Bobadilla, Godfrey JA Walker (1991). American Journal of Obstetrics and Gynecology 164(1):22-28.

Introduction

Cesarean delivery rates are increasing dramatically in many parts of the world, with rates in Latin American countries ranging from 20-49 percent of all deliveries. Many factors have contributed to the proliferation of this procedure. Key among these are the improved safety of the technique vis-a-vis maternal mortality and morbidity, and the belief that greater use of cesarean deliveries has resulted in a reduction in perinatal mortality.

While the relative safety of the procedure under optimal conditions led to the suggestion that women who have not delivered their infants by term should have a 'prophylactic' cesarean delivery, previous studies indicated that cesarean deliveries were associated with low Apgar scores, increased incidence of hyaline membrane disease, and respiratory distress syndrome in delivered infants. Thus, despite widespread use of cesarean deliveries, the effectiveness of the procedure in reducing early neonatal mortality remains questionable.

This study, *Early Neonatal Mortality and Cesarean Delivery in Mexico City,* was an exploration of the relationship between cesarean deliveries provided at hospitals in Mexico City in 1984 and early neonatal mortality (an infant death occurring in the first 7 days after delivery).

> ***"What was truly unique in José Luis' work was that he combined epidemiology and health systems research. Usually you have a big divide, but his dissertation combined both."***
>
> *(Julio Frenk, personal communication, 1997)*

Methods

This case-control study compared 292 early neonatal deaths (cases) and 3,098 infants who survived the early neonatal period (controls) from a total of 25 of the most active maternity units (seven from public assistance hospitals, 14 from Social Security hospitals, and four from private hospitals). Data were collected over a 14-week period during the summer of 1984. All early neonatal death cases except those having lethal congenital malformations, those where the infant weighed less than 1001 grams, or those involving multiple births were included in the study population. To control for the fact that low birthweight (LBW) babies are more likely to die than those of normal weight, all infants in the study sample were divided into two groups: normal birthweight (NBW) babies weighing ≥ 2500 grams and LBW babies weighing < 2500 grams. The case-control method was used for NBW infants such that every 30th baby born in the study hospitals who survived the first seven days was selected as a control. All LBW babies were part of the study population.

Factors other than birthweight can place a newborn at greater or lesser risk of experiencing an early neonatal death. To control for these potentially confounding factors, an index of perinatal risk was constructed for each mother. Based on the mother's total score, newborns were classified as low, medium, or high risk. The factors included in the construction of the risk index were: maternal age, parity, education, marital status, previous pregnancy outcome, height, and illnesses.

To obtain information on care received in the hospital, mothers of all infants included in the study were interviewed and medical records were reviewed. Information from hospital records also was used to estimate the whole-time equivalents of practitioner-types (e.g., interns, specialist obstetricians, residents) working on the maternity wards of the study hospitals.

The association between cesarean delivery and early neonatal outcome was measured in two ways: for LBW babies, the ratio of the mortality rates between those who were delivered vaginally and those who were delivered by cesarean section was calculated as a measure of association; for NBW babies, the odds ratio of exposure to a cesarean delivery was calculated for those who survived the early neonatal period and those who did not. Variables such as maternal risk status, which can affect the likelihood of experiencing an early neonatal death, were controlled for in the analyses.

Results

More than one-quarter (27 percent) of deliveries were by cesarean section, but rates varied by type of hospital and by birthweight. In private hospitals, more than one-third (39 percent) of women were delivered by cesarean section, whereas one-quarter (25 percent) of women in Social Security hospitals and about one-fifth (21 percent) of women in public assistance hospitals had cesarean deliveries.

Low- and normal-birthweight infants who were delivered by cesarean section were more likely to die in the first seven days than those who were delivered vaginally. This risk increased with birthweight up to 3500 grams. Breech position was the only perinatal factor for which the relative risk (RR)[1] of early neonatal mortality was lower among babies delivered by cesarean section compared to those delivered vaginally.

When babies delivered by cesarean section were compared by perinatal risk score, those with medium risk scores had a higher chance of dying than those with high risk scores.

Women 20-29 years of age generally have the lowest overall risk of experiencing an early neonatal death compared to women <20 and >29 years of age. However, in this study, women 20-29 years of age had the greatest excess in early neonatal mortality associated with cesarean delivery. **Even though infants who weigh 3000-3499 have the lowest absolute risk of dying in the first seven days when compared to infants of other birthweights, in this study, they had the highest relative risk of dying in the early neonatal period if delivered by cesarean section.** The excess death rate in this birthweight category cannot be explained by differences in maternal age, parity, education, obstetric history, or other perinatal risk factor as the RRs adjusted for these factors were similar to unadjusted RRs.

Among infants delivered by cesarean section, the relative risk of dying varied, depending on the type of hospital in which the procedure was performed. **Compared to private hospitals, where no newborn deaths were reported, the relative risk of dying was nearly 5 times (4.76) greater in public assistance hospitals and about two times (2.07) greater in Social Security hospitals.**

Conclusions

When this study was conducted, cesarean deliveries were relatively common in Mexico City, ranging from 21 percent of all deliveries in public hospitals to 39 percent of all deliveries in private hospitals. These high rates were in contrast to the percentage of high-risk infants born at these sites (18 percent and 8 percent respectively). Yet breech presentation was the only risk factor for which the early neonatal mortality associated with cesarean delivery was lower than that for babies who were delivered vaginally.

The fact that relative risk of an early neonatal death varied depending on hospital type probably reflects the quality of care delivered at the various sites. In this study, incomplete information on type of birth attendant

[1]Relative risk is a measure of the strength of the association between exposure (in this case, having been delivered by cesarean section) and outcome (in this case, early neonatal mortality).

precluded calculation of the risk of early neonatal mortality according to birth attendant. However, the percent of maternity-ward staff at Social Security and public assistance hospitals who were residents, interns, or specialists was calculated and a ratio of interns and residents to specialists was obtained. The ratio of residents and interns to specialists was nearly 5 to 1 in public assistance hospitals, compared to a ratio of only about 2 to 1 in Social Security hospitals. The authors speculated that inexperienced and inadequately supervised staff at the public assistance hospitals are making decisions to perform and carry out cesarean sections.

The results of this study suggest that in circumstances where rates of cesarean deliveries are high, where they are carried out in suboptimal conditions, and where there are no clear medical indications to deliver NBW infants with low or medium overall risk of dying in the first seven days, performing cesarean deliveries may result in unnecessary early neonatal deaths.

The authors call for the development of objective criteria for deciding to perform cesarean sections and for the development of adequate review procedures of the circumstances that surround cesarean deliveries.

Commentary

Bobadilla and Walker published this article at a time when researchers and public health advocates were calling attention to what Sakala later termed a "largely uncontrolled international pandemic of medically unnecessary cesarean births." (Sakala, 1993). In this context, Ron Gray, Professor of Population Dynamics at The Johns Hopkins School of Hygiene and Public Health stated that Bobadilla and Walker's research "drew attention to the gross misuse, or overuse of c-sections in Latin America" (Gray, personal communication, 1997).

The life-saving potential of cesarean deliveries for the pregnant woman, the fetus, or both is undisputed. Nevertheless, the relationship of increased use of cesarean deliveries on perinatal and maternal outcome remains controversial. Some researchers suggest that increased use of cesarean deliveries may result in a concomitant reduction in perinatal mortality (Bottoms et al., 1980). Other evidence from hospital-based studies indicates that perinatal and maternal mortality declined when cesarean section rates were reduced (De Muylder and Thiery, 1990; Van Roosmalen, 1989; Ziadeh and Sunna, 1995).

At the national level, countries with similar maternal mortality ratios have shown wide variation in c-section rates. For example, using data from 1984 and 1985, Notzon reports that the maternal mortality ratio in Japan, the Netherlands, the former Czechoslovakia, and the United States was around 10 per 100,000 live births, while the cesarean delivery rate was seven to 10 percent in the first three countries and twenty-three percent in the United States (Notzon, 1990). In a nationwide study in Sweden, Nielsen and Olausson found that cesarean delivery rates decreased from 1983 to 1990 and that perinatal mortality declined from 14.2. to 6.3 per 1000 live births during the same time period (Nielsen et al., 1994). While reductions in the perinatal mortality rate cannot be attributed directly to the declining reliance on cesarean deliveries, the authors conclude that it is possible to lower the cesarean section rate nationally without increasing risks to the newborn (Nielsen et al., 1994).

Researchers have attempted to estimate the optimal level of cesarean sections required to achieve enhanced birth outcomes for both mother and child—but no consensus exists. In 1985, the World Health Organization declared that no region should have a rate higher than 10-15 percent (WHO, 1985). Other researchers suggest that about 5 percent of all births will require a cesarean delivery (Nordberg, 1984). More recently, a reference rate of 2.0-2.9 percent of all deliveries has been proposed (De Brouwere et al., 1996).

Despite inconclusive evidence regarding the association of cesarean deliveries and perinatal or maternal outcome, and a lack of consensus regarding ideal reference rates for cesarean sections, one thing is clear: cesarean deliveries remain both life-giving and potentially dangerous. For that reason, where cesarean sections are performed, providers must receive

adequate training on how and when to use the technique (De Muylder, 1993). Furthermore, as Bobadilla asserts, health facilities must supervise health care staff, and adopt and practice appropriate review procedures (Bobadilla and Walker, 1991). Researchers and clinicians also have called for increased attention to procedures such as active management of labor which may provide safer alternatives to cesarean deliveries (De Muylder, 1993).

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Quality of Perinatal Medical Care in Mexico City—An Epidemiological Study on the Effects of Medical Care Quality on Perinatal Mortality

José Luis Bobadilla (1988). Perspectivas en Salud Pública No. 3. México: Secretaria de Salud and Instituto Nacional de Salud Pública.

Introduction

Most births (87 percent) in Mexico City occur in public assistance, Social Security, or private hospitals. Yet, despite widespread availability of health services and a relatively high standard of living in Mexico City as compared with other states, the perinatal mortality rate (PNMR) in 1979 was 35.3 per 1,000 births. This is comparable to levels found in developed countries in the 1940s. There are two possible explanations for the high PNMR: high prevalence of maternal social, biological, and obstetric risk factors, or problems in the quality of perinatal care.

The goals of this research were to determine to what extent the high PNMR among institutional deliveries could be explained by variations in the quality of perinatal medical care and to identify the components of quality of care that most influence perinatal mortality, after controlling for social and biological risk factors that may influence perinatal outcome.[1]

[1]A list of these risk factors may be found in the preceding article on neonatal mortality and cesarean delivery. These factors are the basis for the maternal risk score.

Methodology

The study sample consisted of the 25 maternity units compared in the preceding article, *Early Neonatal Mortality and Cesarean Delivery in Mexico City*.

According to Donabedian, quality of care can be measured by structure, process, and outcome indicators. Structure refers to available resources and the organization of services. Process represents the procedures health care personnel undertake. In this study, hospital structure and the process of perinatal medical care were assessed, with perinatal mortality serving as the outcome indicator.

Individual-, hospital-, and health agency-level data were gathered in the same manner as discussed in the research on early neonatal mortality and cesarean deliveries. Information was obtained on hospital size and general characteristics, material resources and medical technology, organization, and human resources.

A case-control approach was used to examine the relationship between the process of medical care received and perinatal mortality. Of the 32,701 babies born in the selected hospitals during the study period (14 weeks in 1984), 983 (three percent) did not survive the perinatal period. These deaths served as the "cases," which were compared to 3,599 systematically selected controls who survived the first seven days after delivery. As in the study on early neonatal mortality and cesarean delivery, newborns were stratified by birthweight. Those perinatal deaths deemed non-preventable (i.e., macerated stillbirths and those due to congenital anomalies or occurring in multiple births) were excluded from the study population.

Perinatal mortality rates in the 25 hospitals were calculated and adjusted for birthweight and maternal risk factors. Odds ratios were calculated, adjusting for potential confounding variables (i.e., birthweight and maternal social, biological, and obstetric risk factors), to ascertain whether the relative frequency of exposure to low quality of care was higher among cases than among controls. Standardized perinatal mortality ratios were calculated by health agency and standardized early neonatal mortality (ENM) rates were calculated by level and mix of medical staffing on maternity wards. Percentages of women receiving antenatal care and delivering in each of the three types of institutional settings were calculated by maternal risk score. Crude and adjusted odds ratios for ENM and stillbirth (SB) were calculated by receipt of antenatal care (any or none), and by content of antenatal care— specifically, receipt of various screening procedures (i.e., height and weight measurement; the taking of blood pressure, urine and blood; and pelvic examinations). To determine the effect of multiple omissions of screening procedures, a "score of quality of antenatal care" was constructed. Infants were classified as having received "poor", "adequate", or "good" antenatal care based on the extent to which they had received the aforementioned procedures. Crude and adjusted odds ratios for ENM and SB were calculated by quality of antenatal care.

> ***"He [José Luis Bobadilla] was also a pioneer in the measurement of the quality of perinatal care; his doctoral dissertation is a classical work on the subject."***
>
> *(In memoriam. José Luis Bobadilla Fernández. Salud Pública de México 38 (5):386-392, 1996)*

Donabedian posits that a curvilinear relationship exists between quantity and quality of care such that excess resources may lead to waste, increased health risks, and worse health outcomes. To test this hypothesis, the mix ratio of medical personnel (i.e., the ratio of residents and interns to designated specialists in the obstetrics and gynecology wards) was calculated for each site and compared to the ENM rate in that setting.

Results

The perinatal mortality rate was 30.1/1,000; the stillbirth rate was 14.1 and the neonatal mortality rate was 16.0. **The main finding of this study was that after controlling for social and biological factors, the quality of perinatal medical care affected the perinatal mortality rate. Furthermore, quality of care, as measured by the standardized mortality ratio, varied across health agencies. It was**

lowest in public assistance hospitals and highest in private hospitals.

The level of medical staffing on maternity wards was associated with early neonatal mortality. However, the relationship was not linear. Increasing the number of designated specialists per 10,000 births was associated with lower ENM up to a certain point, above which further increases in staffing led to an increase in ENM.

Neither the number of residents, nor the total number of doctors in obstetric and gynecology wards, was associated with early neonatal mortality.

The mix ratio of medical personnel on the obstetric and gynecology wards was associated with ENM rates. Hospitals with a higher ratio of interns and residents to designated specialists had statistically significant higher levels of early neonatal mortality. **These results indicate that the mix ratio is a sensitive *structural* indicator of the quality of care in hospitals. They also confirm Donabedian's hypothesized curvilinear relationship between quantity and quality of medical care. Importantly, it was the medical staff *mix ratio* and not the total number of physicians or residents that was associated with quality of care.**

An inverse relationship was found between need for perinatal medical care (as measured by maternal risk score) and quality of care. Specifically, those with higher risk scores received less antenatal care and were more likely to deliver in settings with low levels of human and material resources.

Variations in the content and quantity of antenatal care had no effect on the stillbirth rate and only a moderate effect on early neonatal mortality.

Commentary

The idea that quality of care may influence women's reproductive health service use has intuitive appeal. Yet, there exists scant empirical data elucidating this relationship. The public health community's inability to make definitive statements regarding the impact of quality of health care on reproductive health service demand and use—and ultimately on health outcomes— results from several factors: (1) the development of conceptual frameworks for thinking about quality of care generally has been restricted to the family planning sector (Bruce, 1990; Finger and Hardee, 1993). As a corollary, there have been few attempts to define quality of care elements in other settings (e.g., prenatal care or services for sexually transmitted diseases) (Whittaker et al., 1996; Al-Qutob et al., 1996); (2) in the field, efforts to operationalize extant frameworks have met with mixed results; (3) even where quality of care elements have been defined, determining appropriate indicators and measurement techniques remains an ongoing and sometimes problematic process; and (4) what factors constitute quality of care and who defines it remain at issue.

The Bruce-Jain framework (Bruce, 1990) suggests that quality of care in family planning consists of six elements: method choice, technical competence, information flow to clients, interpersonal relations, follow-up and continuity mechanisms, and appropriate constellation of services.

This framework has been widely accepted and endorsed in the family planning and research communities and has served as the basis for the development of much needed quality of care indicators, assessment tools, and more recently, frameworks in other domains (e.g., prenatal care) (Al-Qutob et al., 1996, Finger and Hardee, 1993, Mensch et al., 1996). However, results of research attempting to operationalize the Bruce-Jain approach highlight certain deficiencies. (Al-Qutob et al., 1996; Mensch et al., 1996; Whittaker et al., 1996). Some of these deficiencies stem from the fact that attempts to apply the Bruce-Jain framework in the field are relatively recent and much work remains to be done to develop appropriate indicators representing the various elements and to refine techniques for their measurement. Other weaknesses derive from the limitations of the framework itself.

For example, in certain cases, there remain problems with indicator selection for assessing some elements (e.g., technical competence) and methods for their measurement. In her examination of the impact of family planning services on women's contraceptive use in Peru, Mensch measures technical competence by whether providers had received at least one course in family planning, whether the clinic was observed to be clean, and whether the provider wore gloves and washed his or her hands before conducting examinations (Mensch et al., 1996). What is in doubt is not the importance of basic training and cleanliness but the content validity of these measures of technical competence. Specifically, limited provider training and basic cleanliness do not ensure appropriate performance.

Direct observation of client-provider interaction might give a more accurate indication of true competence, but this method of data collection is wrought with difficulties. In some settings, such observation may be culturally inappropriate. Furthermore, the Hawthorne effect, in which people perform better when they know they are being observed, may be present. Additionally, efforts must be made (e.g., conducting tests of inter-rater reliability) to ensure the validity of observational data.

The MotherCare experience has shown that technical competence requires standards be in place against which to compare observed provider performance.

Other observations or criticisms of the framework are that: (1) the elements are not necessarily applicable to family planning efforts occurring outside a service delivery point (AbouZahr et al., 1996) (e.g., outreach efforts); (2) macro-level forces with the potential to influence quality of care and service delivery (e.g., health policy) are missing (AbouZahr et al., 1996); (3) the framework's elements fail to incorporate the client's view of what constitutes quality of care (AbouZahr et al., 1996); and (4) gender relations between clients and providers, among providers, and within institutions are ignored (AbouZahr et al., 1996; Al-Qutob et al., 1996).

Criticisms of Bruce's framework aside, this approach represents a major advance in the conceptualization of quality of care and is a useful base for the development of frameworks in other domains of women's reproductive health. Other extant models continue to be useful. Specifically, Bobadilla's doctoral research on assessing the quality of care using Donabedian's framework of *structure, process,* and *outcome* indicators demonstrates the utility of this approach. What is needed now is the development of frameworks that account for environmental and macro-level issues for use in programs addressing women's reproductive health. Furthermore, researchers and program staff must continue to work together to develop appropriate indicators for quality of care, to refine measurement techniques, and to provide opportunities to assess the validity of quality of care concepts and measurement methods in the field.

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A QUARTERLY NEWSLETTER AND LITERATURE REVIEW ON MATERNAL AND NEONATAL HEALTH AND NUTRITION

METHODOLOGICAL ISSUES IN PERINATAL MORTALITY RESEARCH

Each year, approximately eight million perinatal deaths occur throughout the globe, with 98% of them taking place in developing countries (WHO, 1996). Perinatal mortality includes deaths after the 22nd week of gestation through the 7th day of life (WHO, 1992). Unlike infant mortality, perinatal mortality has been more resistant to child survival efforts and has only recently received global attention. The leading causes of perinatal death — complications of preterm birth, birth asphyxia/birth trauma, and bacterial infections — are often suggestive of mistimed, inadequate, and/or inappropriate maternal and perinatal care. Nevertheless, quality of obstetric care receives little research attention relative to the contextual factors (e.g., maternal sociodemographic characteristics) which are more resistant to short-term interventions.

Our current state of knowledge regarding perinatal mortality is derived primarily from hospital-based studies. Although there are merits of institution-based studies, most births in developing countries occur within the community and in the absence of formally trained health personnel. Thus, it is necessary to obtain data from both health facilities and the broader community and to evaluate the quality of data derived from both. There is also a need to develop research strategies to correctly estimate levels of perinatal mortality and identify potential targets for intervention. Intervention studies are particularly scarce, and even among the few published studies, methodologies of interventions and evaluations are not often explained.

In the interest of improving the measurement of perinatal mortality and the care associated with perinatal health, we have first examined the appropriateness of traditional techniques and data sources, as well as explored alternative methods and sources of data, to obtain maximum information from the minimum amount of resources. Previous issues of ***MotherCare Matters*** addressed topics such as risk assessments, cause of death classification, underestimation of stillbirths, and the use of perinatal mortality as a surrogate indicator for maternal mortality. This issue of ***MotherCare Matters*** abstracts two epidemiological studies and two intervention studies and discusses key methodological issues relevant to perinatal mortality and health research in developing countries. The focus of our discussion is on population-based surveys to measure levels of mortality and identify risk factors, as well as interviews with health workers and use of their records as sources of data to evaluate small intervention studies. This issue also incorporates supporting data and information from the current literature on perinatal mortality.

Donna Espeut, Consultant
and Marjorie Koblinsky, Director

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Demographic Survey of the Level and Determinants of Perinatal Mortality in Karachi, Pakistan

Fariyal F Fikree and Ronald H Gray (1996). Paediatric and Perinatal Epidemiology 10:86-96.

Introduction

In Pakistan, information regarding perinatal mortality is primarily hospital-based. Data from one large public hospital in Karachi indicates that approximately 60% of women admitted to the facility were referred because of obstetric complications. Due to the overrepresentation of delivery complications in hospitals, the authors conducted a population-based study to obtain epidemiological information on perinatal deaths that was representative of all pregnancies occurring within the population.

The analysis described in this article (1) explores the utility of a demographic survey to estimate the level of perinatal mortality; (2) identifies risk factors for perinatal mortality; and (3) highlights prevention strategies in eight squatter communities in Karachi, Pakistan.

Methods

In August and September 1989, the study team contacted every household within the study population and administered a demographic survey to 98% of the households. The demographic survey entailed two questionnaires; one collected sociodemographic information, and the second was a truncated pregnancy history.[1]

The pregnancy history, which was limited to reproductive events occurring during the five years preceding the survey, was administered to all ever-married women between the ages of 15 and 54 years. The investigators selected a random 2% sample of the households and conducted re-interviews in order to test the reliability[2] of maternal reports; there was 98% agreement in maternal reports of death.

Standard definitions of a perinatal death[3] and the perinatal mortality rate (PMR)[4] were used in this analysis.[5] PMR calculations used all births and perinatal deaths occurring over the three years preceding the survey. For the risk factor assessment, surviving children born during the three-year reference period were the comparison group. This analysis excluded all deaths occurring beyond the perinatal period, and was limited to the 375 perinatal deaths and 6070 current survivors.

Results

The PMR within this study population was 54.1 per 1000 total births, with equal numbers of deaths occurring in both the late fetal and early neonatal periods. Perinatal deaths accounted

[1]A *truncated pregnancy history* documents the reproductive events occurring within a particular reference period (e.g., the past five years), as opposed to a woman's entire reproductive life (Westoff, Goldman, & Moreno, 1990).

[2]*Reliability* refers to the consistency, or repeatability of results (Gordis, 1996). It is the degree to which results obtained from a particular test or instrument would be replicated if the test/instrument was administered more than once.

[3]*Perinatal deaths* include late fetal deaths and early neonatal deaths.

[4]The *perinatal mortality rate (PMR)* is perinatal deaths (i.e., stillbirths plus early neonatal deaths), divided by total births (i.e., live births plus stillbirths).

[5]It is unknown whether the 22nd week of gestation [ICD-10 definition] or the 28th week of gestation [ICD-9 definition] was used to mark the beginning of the late fetal period.

for 65% of neonatal mortality[6] and 32% of infant mortality.[7]

Surrogate measures of poor socioeconomic status (SES), such as maternal and paternal illiteracy, limited household assets, and maternal employment outside of the home showed statistically significant associations[8] with perinatal death. However, household structure (i.e., nuclear versus extended) and other SES measures were not significantly associated with perinatal mortality.

Other significant associations with perinatal mortality included: primigravidity (i.e., first pregnancy), grand multigravidity (i.e., > 9 pregnancies), maternal report of a stillbirth or abortion in the previous pregnancy, and short birth intervals.

When risk factors were examined in a multivariate analysis, **the following variables remained significantly associated with perinatal mortality: maternal illiteracy, maternal employment outside of the home, primigravidity, short birth intervals, and physician-assisted hospital deliveries**. Reported **knowledge of family planning** also demonstrated a protective effect against perinatal mortality.

To assess the public health implications of these findings, the authors compared population attributable risks.[9] As seen in Table 1 (next page), **the highest attributable risks were associated with maternal illiteracy and low socioeconomic status**.

Conclusions

Given that the PMR and the ratio of stillbirths to early neonatal deaths seemed reasonable, the authors conclude that data from demographic surveys may be used to evaluate perinatal mortality. However, they speculate that estimates are likely to be conservative due to the underreporting of female infant deaths.

Caution should be given to interpreting significant associations between formally trained health personnel and perinatal death, since these associations reflect the fact that delivery care is usually sought from physicians once obstetric complications arise. As a result, physicians attend a disproportionate number of deliveries with high likelihood of poor outcomes. The authors suggest that use of doctors' services in the hospital is a proxy for complications of pregnancy or delivery.

The protective effect of family planning knowledge suggests that, even in contexts with low levels of female education, preventive health awareness plays a positive role in determining pregnancy outcome. The overlap of correlates of perinatal mortality with those of maternal mortality also suggests the utility of perinatal mortality as a surrogate measure of maternal mortality. Finally, based upon attributable risk comparisons, the authors conclude that improvements in the educational and socioeconomic status of women are requisite for substantial reduction of perinatal mortality within this population.

Commentary

Of the two current DHS standard questionnaires, one includes a birth history, and the other a pregnancy history. Although birth histories only document live births, and are thus inefficient in estimating the level of perinatal mortality, the pregnancy history captures both stillbirths and live births.

Until recently, demographic survey data were regarded as inappropriate sources of perinatal statistics. However, the perinatal survey in Pakistan provides evidence that **a demographic survey**, which was not initially intended to document perinatal mortality, **is a**

[6]*Neonatal mortality* includes deaths within the first 28 days of life.

[7]*Infant mortality* includes deaths within the first year of life.

[8]The criteria for *statistical significance* in this study was a p-value less than 0.1. A statistically significant association implies the likelihood that the observed association (in this instance, between perinatal mortality and the risk factor) being due to chance is less than 10%.

[9]In this instance, *population attributable risk* is the amount or proportion of perinatal mortality that can be attributed to a specific exposure (Gordis, 1996). It estimates the potential impact of interventions aimed at eliminating a particular risk factor within the population.

Table 1—Adjusted Odds Ratios (OR)* and Population Attributable Risk (%) of Perinatal Mortality by Selected Demographic, Socioeconomic, and Health Care Factors

Risk Factors	Adjusted Odds Ratio	95% Confidence Interval (CI)	Attributable Risk Percent (95% CI)
Maternal Education			
Illiterate	1.4	[1.0,2.1]	28.9 (27.8,30.0)
Primary	1.3	[0.8,2.0]	
More than Primary	1.0	reference category	
Maternal Occupation			
Gainfully Employed	1.8	[1.3,2.4]	7.3 (4.8,9.8)
Not Gainfully Employed	1.0	reference category	
Paternal Age (years)			
<25	0.7	[0.4,1.2]	5.7 (2.1,9.1)
25-34	1.1	[0.8,1.6]	
35-49	1.0	reference category	
≥50	2.1	[1.4,3.1]	
Household Assets			
≤4	1.8	[1.1,2.7]	46.3 (45.2,47.3)
5-8	1.0	reference category	
Maternal Age (years)			
<20	0.8	[0.4,1.6]	
20-24	1.2	[0.9,1.6]	
25-29	1.0	reference category	
30+	1.3	[0.9,1.8]	
Pregnancy Order			
Primigravid	2.4	[1.4,3.8]	14.8 (13.1,16.5)
2-3	1.2	[0.9,1.7]	
4-6	1.0	reference category	
7-8	0.9	[0.6,1.3]	
9+	1.4	[0.9,2.0]	
Outcome of previous pregnancy			
Stillbirth/Abortion	3.2	[2.2,4.7]	10.4 (5.5,15.0)
Livebirth	1.0	reference category	
Birth Interval (months)			
<24	1.8	[1.2,2.6]	17.4 (15.9,18.8)
24-35	1.0	reference category	
Maternal Knowledge of Family Planning			
Yes	0.7	[0.6,1.0]	5.2 (3.7,6.7)
No	1.0	reference category	
Health Care at Delivery			
Traditional Birth Attendant (TBA)/Relative	1.0	reference category	8.3 (6.7,9.8)
Midwife/Lady Health Visitor (LHV)	1.8	[0.9,3.6]	
Nurse	0.9	[0.6,1.2]	
Physician at home	2.2	[0.7,6.5]	
Physician at hospital	1.4	[1.1,1.8]	
Sex of Newborn			
Male	1.8	[1.4,2.2]	28.4 (27.5,29.3)
Female	1.0	reference category	

Source: Fikree and Gray, 1996. Reproduced with permission of the publisher, Blackwell Science, Ltd.

*The adjusted odds ratios presented in this table were obtained from a regression model that included all variables appearing in Table 1.

viable source of data for perinatal mortality statistics. A similar analysis was conducted by Stanton (1995) in the Philippines which dispelled the myth that levels of perinatal mortality could not be estimated from demographic survey data. In the Filipino study, the reliability of PMRs (95%) was comparable to those of infant and child mortality rates. The present analysis yielded a higher reliability (98%), even with the use of truncated reproductive history information.

Although reliability studies test if results are consistent, they are no indication of the validity of estimates. Thus, the accuracy of this study's estimates remains unknown. No instrument currently exists as the gold standard for measuring perinatal mortality. However, a comparison of study findings with previous studies is probably the best gauge of whether the nature and magnitude of associations observed within a study are plausible.

When the objective is simply to estimate levels of perinatal mortality, a truncated history may be used to derive statistics from a smaller amount of information. The quality of date-reporting also tends to be much higher in truncated histories than in full histories, since only the most recent events are documented (Westoff et al., 1990). Apart from Pakistan, the truncated history has been applied in Latin America (Becker and Sosa, 1992; Westoff et al., 1990; Goldman et al., 1989), where its accuracy and reliability were compared to full histories. Generally speaking, the truncated methods demonstrated higher completeness of reporting than full birth and pregnancy histories.

Although there are advantages in using the truncated history, some limitations associated with its use were also demonstrated in this study. There is a limited ability to estimate birth intervals longer than the reference period and to examine pregnancy outcomes beyond the five-year window of recall. As a result, the truncated history is inappropriate for determining trends in perinatal mortality. Nevertheless, results from this study strongly suggest that demographic surveys can be used to estimate perinatal mortality, though the utility of the demographic survey in estimating perinatal mortality must be tested in other contexts.

In this article, the authors discuss the use of perinatal mortality as a proxy for maternal mortality. As discussed in ***MotherCare Matters*** 2(1), death of the mother almost inevitably results in death of the fetus or infant; however, a perinatal death does not necessarily result in a maternal death. The works of Shah et al. (1984a and 1984b) in India suggest that stillbirths are more often linked to causes of maternal death than early neonatal deaths. Stillbirths may be a more sensitive surrogate for maternal mortality than overall perinatal mortality. Nevertheless, perinatal mortality indicators may alert health planners and professionals to general "problem areas" (e.g., gaps in service delivery, inappropriate delivery practices) which may also compromise maternal health and survival.

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The Epidemiology of Perinatal Death in Jamaica

Rosemary Greenwood, Jean Golding, Affette McCaw-Binns, Jean Keeling, and Deanna Ashley
(1994a). Paediatric and Perinatal Epidemiology 8(Suppl 1):143-157.

Introduction

Perinatal statistics from hospital-based populations are frequently biased due to overrepresentation of high risk pregnancies. It is therefore necessary to base estimates on the entire geographic population of pregnant women and their infants. In response to this need, the Jamaican Perinatal Mortality and Morbidity Study (JPMMS) was conducted to identify aspects of mothers and their pregnancies that were associated with perinatal morbidity and mortality. The analysis reviewed in this article identified medical, social, biological, behavioral, environmental, and medical-care correlates of perinatal mortality.

Methods

This prospective study used two overlapping samples of (1) all births occurring within a two-month period (n=10,507), and (2) all stillbirths of at least 500g and all neonatal deaths occurring over a one-year period (n=2,020). The present analysis excluded twin deliveries and twin perinatal deaths. Results presented in this article pertain only to the 9,919 singleton births and 1,847 perinatal deaths of singletons.

Trained study personnel conducted maternal interviews and abstracted clinical records to obtain information on various variables related to perinatal outcome. The estimated completeness of birth and death ascertainment during the study period was approximately 94%.

Associations between perinatal mortality and various study variables were assessed in the absence and presence of past obstetric history.

Results

The PMR for the study period was 38 per 1000 total births, and the following variables were significantly associated with perinatal death:

Sociodemographic Characteristics

- ✦ maternal marital status (single)
- ✦ maternal unemployment
- ✦ number of adults in the household
- ✦ number of children <11 years of age
- ✦ shared toilet facilities

Maternal Health Characteristics

- ✦ short stature
- ✦ syphilis infection
- ✦ vaginal discharge/infection
- ✦ vaginal bleeding during pregnancy
- ✦ high blood pressure
- ✦ proteinuria
- ✦ antenatal diagnosis of pre-eclampsia
- ✦ diabetes
- ✦ no iron supplementation
- ✦ history of stillbirth
- ✦ history of early neonatal death
- ✦ previous Caesarean section
- ✦ number of miscarriages/terminations

Maternal Behavioral Characteristics

- ✦ alcohol consumption

Other

- ✦ late initiation of antenatal care
- ✦ low availability of physicians in area of residence

Table 2 presents adjusted odds ratios for independent predictors of perinatal mortality.

Table 2—Adjusted Odds Ratios (OR),* 95% Confidence Intervals for Independent Predictors of Perinatal Mortality

Variable	Adjusted Odds Ratio* [95% Confidence Interval]
Union (Marital) Status	
Married	0.66 [0.51,0.85]
Common Law	0.85 [0.71,1.00]
Visiting/Single	reference category
Mother's Employment Status	
Employed	reference category
Housewife	0.82 [0.68,0.98]
Unemployed	1.21 [1.02,1.45]
Number of Adults in the Household	
<2	0.77 [0.57,1.03]
2	reference category
3	0.87 [0.71,1.06]
4+	1.12 [0.93,1.35]
Number of Children <11 years old in the household	
0	reference category
1	0.62 [0.51,0.76]
2	0.66 [0.54,0.81]
3+	0.48 [0.39,0.59]
Sole Use of Toilet	
Sole	reference category
Shared	1.36 [1.14,1.62]
Maternal Height	
< 5 ft, 2 in	0.93 [0.72,1.18]
5 ft 2 in- 5 ft 5 in	reference category
5 ft 6 in+	0.66 [0.53,0.83]
Ever Drink Alcohol	
No	reference category
Yes	0.78 [0.64,0.96]
Trying to Get Pregnant	
Yes	1.51 [1.23,1.84]
No	reference category
Indifferent	1.18 [0.82,1.69]
Syphilis	
No	reference category
Yes	2.22 [1.64,3.02]
Vaginal Discharge or Infection	
None	reference category
Yes, Treated with Antibiotics	1.08 [0.87,1.34]
Yes, Other Treatment	1.27 [0.93,1.73]
Yes, Not Treated	1.97 [1.44,2.69]
Bleeding <28 weeks	
No	reference category
Yes	2.09 [1.68,2.62]
Bleeding 28+ weeks	
No	reference category
Yes	2.58 [1.99,3.35]
First Diastolic Blood Pressure (mm)	
<60	1.14 [0.82,1.58]
60-69	reference category
70-79	1.44 [1.17,1.77]
80-89	1.94 [1.47,2.56]
90+	3.22 [2.09,4.95]
Unknown	1.73 [1.09,2.75]
Highest Diastolic Blood Pressure (mm)	
<70	1.18 [0.93,1.51]
70-79	reference category
80-89	0.79 [0.63,0.99]
90-99	0.99 [0.71,1.39]
100-109	1.68 [1.09,2.58]
110+	3.40 [2.02,5.71]
Unknown	0.92 [0.59,1.43]
Highest Level of Proteinuria	
None/Trace	reference category
+	1.00 [0.77,1.28]
++	1.66 [1.11,2.50]
+++	3.06 [1.86,5.04]
Unknown	2.18 [1.83,2.60]
Antenatal Eclampsia	
No	reference category
Yes	4.33 [1.86,10.1]
Diabetes	
No	reference category
Yes	2.14 [1.23,3.72]
Start of Antenatal Care	
First Trimester	0.71 [0.59,0.87]
Second Trimester	reference category
Not before 28 weeks	0.90 [0.73,1.12]
Iron Taken	
Yes	reference category
No	1.56 [1.34,1.82]
Type of Perinatal Care in Parish of Residence	
A	reference category
B	1.64 [1.37,1.96]
C	1.67 [1.38,2.02]
Number of Miscarriages and Terminations	
0	reference category
1	1.33 [1.07,1.66]
2+	2.20 [1.51,3.20]
Previous Stillbirth	
No	reference category
yes	2.98 [2.22,4.02]
Previous Infant Died <7 days old	
No	reference category
Yes	2.06 [1.39,3.06]
Previous Caesarean Section	
No	reference category
Yes	1.92 [1.25,2.94]

Source: Greenwood et al., 1994a. Reproduced with permission of the publisher, Blackwell Science, Ltd.

*Adjusted Odds Ratios were derived from a regression analysis which included all variables appearing in Table 2.

Conclusions

The authors conclude that although perinatal mortality is cited as being a reflection of socioeconomic development, the mechanism is unclear. Women of low socioeconomic status were not at increased risk for perinatal mortality, and there was little variation with respect to maternal education in the study sample. Associations between perinatal mortality and a) parity, and b) age, disappear once past obstetric history is taken into account. The authors attribute this lack of effect to the "risk-approach paradox:" during the study period, Jamaican midwives were instructed to treat mothers of parity 0 or 5+ as high-risk and were efficient in identifying high risk pregnancies. As a result, perinatal mortality was reduced substantially among women deemed "high risk."

Maternal infection, hemorrhage, and hypertensive disorders of pregnancy, which are conditions that frequently jeopardize maternal survival, are major culprits of perinatal mortality in Jamaica. The authors did not explore traditional topics of discussion such as birth weight and gestational age in this analysis because they fall within the causal pathway between selected maternal factors and perinatal mortality. Interventions that aim to (1) identify and treat hypertensive disorders of pregnancy, bleeding and genito-urinary infections (e.g., syphilis, vaginal infections), (2) provide prophylactic iron and (3) organize obstetric care such that all women have access to expert obstetric and pediatric care are most effective in reducing perinatal mortality.

Commentary

In the interest of generalizability, the decision regarding whether to conduct a hospital-based or community-based study should reflect the health-seeking and health care utilization patterns of pregnant women within the general population. The rationale behind conducting a population-based study is to document vital events occurring in both hospitals and communities, thus ensuring that the study population is representative of all births and deaths within the country. One of the strengths of the JPMMS is that it was a population-based study. The need for a population-based perinatal study is less urgent in Jamaica relative to other developing countries, however, because 89% of Jamaican women deliver within health institutions (WHO, 1993). Due to the substantial proportion of institutional deliveries in Jamaica, an institution-based study would be fairly representative of all deliveries and therefore, population-based. However, in countries where home deliveries are the norm, population-based studies would ensure that data is obtained on births and deaths in institutions and communities.

The sampling technique employed in this study— **capturing all births within a two-month window and all perinatal deaths within a one-year window of observation— ensured that a sufficient number of perinatal deaths would be included in the analysis.** In turn, this approach **increased the statistical power**[1] of the study. The sampling method also **allowed for the collection of detailed information from a sample of infant survivors** (i.e., over a period of two months as opposed to the 12-month period of observation for deaths) who are assumed to be representative of the general population of infant survivors.

Researchers employing a similar sampling technique in future studies must exercise caution in calculating PMRs, which should include numerators and denominators from the same population of pregnant women and infants. With respect to the Jamaican study, infants born in the 'cohort months' (September and October 1986) obviously did not include all infants at risk for perinatal death during the 12-month period (1 September 1986 to 31 August 1987) in which perinatal deaths were ascertained. The PMR reported in this article, 38 per 1000, included 2,069 perinatal deaths, and an *estimated* 54,400 total births during the same 12-months as the death ascertainment (Ashley et al., 1994). Although sources of the estimated

[1]*Power* is a statistical concept that indicates how good a study is at correctly identifying associations between risk factors and an outcome (Gordis, 1996). The authors did not state the power used in this study.

number of total births are unknown, only pregnancies at-risk for perinatal death during the 12-month study period comprised the denominator of the rate, and thus, is a valid calculation of the PMR.

In comparison to the Fikree & Gray (1996) study in Pakistan that relied upon retrospective data collection, this study documented births and deaths prospectively. A major advantage of prospective data collection is that the reporting of information is not constrained by the limitations of recall. The use of multiple data sources also improved death ascertainment, since unavailable information from one source of data may be obtained from other sources.

During the earlier part of the decade, many country-level estimates of perinatal mortality in the developing world were based upon models that derived national PMRs from infant mortality data. For example, ***MotherCare Matters*** 1(2-3) reviewed regional estimates of perinatal mortality (the *perinatal mortality ratio*) based upon this approach. The perinatal mortality ratio uses live births in the denominator, as opposed to the perinatal mortality rate, which uses both live births and stillbirths. Although the perinatal mortality ratio is a proxy for the PMR, it is not a valid substitute. The use of large scale, population-based studies such as the JPMMS allows for the collection of data necessary to calculate the PMR directly.

With respect to data collection techniques, there is substantially less flexibility for large population-based studies than smaller-scale community studies. Studies of similar magnitude as the JPMMS are, for the most part, limited to the traditional data sources: the maternal or household survey, medical records, and vital registration. However, smaller studies may explore techniques such as the verbal autopsy or the use of perinatal audits. These techniques are informative approaches to assessing perinatal mortality, not for levels, but for barriers to care and opportunities for intervention.

The JPMMS also classified deaths according to the Wigglesworth classification system[2] (Ashley et al., 1994). Although the Wigglesworth classification may highlight specific intervention areas (e.g., a large proportion of macerated stillbirths signals the need to focus on maternal characteristics and the antenatal period), the classification system may not be best suited for applications in the developing world. As noted in ***MotherCare Matters*** 1(2-3), there is a need to expand the fifth category ("other" category) to include specific infections and neonatal tetanus. In addition, since most deliveries take place in the absence of a medically trained provider, the first four categories of the Wigglesworth classification would be difficult to ascertain accurately.

Although perinatal deaths in the Jamaican study were classified according to the Wigglesworth classification system, the authors did not disaggregate perinatal mortality into late fetal and early neonatal deaths for the statistical analysis. This particular article discusses correlates of overall perinatal mortality and does not do so for stillbirths and early neonatal deaths separately. However, other analyses using the same dataset (Escoffery et al., 1994; Golding et al., 1994; Greenwood et al, 1994b; McCaw-Binns et al., 1994) do distinguish between antepartum fetal deaths, deaths due to immaturity, and deaths associated with intrapartum asphyxia. It is important to disaggregate perinatal mortality by type and/or time of death in order to assess whether different risk factors and mechanisms exist for these different components of perinatal mortality.

The utility of perinatal mortality as a proxy indicator for maternal mortality also comes into question in the Jamaican setting, since conditions that are life-threatening to the mother—hypertension, infection, and hemorrhage—were major contributing factors to perinatal mortality. Perinatal deaths still occur more frequently than maternal deaths, and therefore should not be used to assess magnitude of maternal mortality. Despite this limitation, the use of perinatal mortality as a proxy may be appropriate in a setting such as Jamaica's,

[2]Wigglesworth (1980) devised a cause of death classification system based upon the following pathological subgroups: (1) Normally formed macerated stillbirth; (2) Congenital malformations (stillbirth or neonatal death); (3) Conditions associated with immaturity (neonatal death); (4) Asphyxial conditions developing in labor (fresh stillbirth, neonatal death); and (5) Specific conditions other than above.

where LBW and infections such as tetanus play smaller roles in perinatal mortality.

Whereas Fikree & Gray (1996) place improvements in female status at the crux of reducing perinatal mortality in Pakistan, Greenwood et al. (1994a) emphasize improvements in access to and quality of obstetric care (in particular, the prevention, detection, and treatment of maternal medical conditions) in Jamaica. In Pakistan, maternal education and socioeconomic conditions were highly salient in determining perinatal outcome. However, the Jamaican study did not reveal an association between low socioeconomic status and perinatal mortality, and there was little variation with respect to maternal education among Jamaican mothers in the study. Although maternal employment status and perinatal mortality were significantly related in the Jamaican study, the authors believe that employment status reflects the Jamaican woman's self concept more than her socioeconomic status.

The Fikree and Gray (1996) and Greenwood et al. (1994a) articles highlight the need to take aspects of the socio-cultural context and health system into account when developing perinatal mortality interventions. In addition to having differences in the impact of socioeconomic status on perinatal mortality, Jamaica and Pakistan also differ with respect to the feasibility of interventions in obstetric care. In Jamaica, approximately 90% of deliveries occur in the presence of a trained delivery attendant (WHO, 1993). In contrast, only 35% of all deliveries in Pakistan take place with a trained attendant (WHO, 1993). In Jamaica, improvements in the quality of care within the formal health sector may reduce perinatal mortality. However, unless women in Pakistan use the formal health sector for delivery, this same strategy would not work in Pakistan. Thus, researchers and health providers in Pakistan must aim to improve supply-side factors (e.g., obstetric practices within the formal sector), as well as generate a demand for health services and increase awareness regarding safe delivery practice and timely referral of complications within communities.

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SECTION TWO

PERINATAL MORTALITY INTERVENTIONS

Birth Attendants and Perinatal Mortality

AK Pratinidhi, AN Shrotri, Usha Shah, HH Chavan (1985). World Health Forum 6:115-117.

Introduction

High levels of perinatal mortality prompted the Indian government to initiate widespread training of traditional birth attendants (a.k.a. *dais*). However, little impact has been observed on perinatal mortality. This study documented knowledge, attitudes, and practices of trained and untrained *dais* in rural communities surrounding Sirur in Maharashtra, India in 1982.

Methods

Forty-eight *dais* ranging between the ages of 35 and 80 years existed within this population. Three-fourths of them were illiterate. Twenty-six *dais* underwent a government training program,[1] with 11 of these women receiving an additional three months training to qualify as community health guides. The remaining 22 *dais* did not receive any specialized training.

In 1982, the study team documented aspects of antenatal, intranatal, and postnatal care for every pregnancy occurring in the rural population surrounding Sirur (population: approximately 30,000). Since the majority of *dais* were illiterate, they were unable to maintain any records of pregnancies and deliveries. As a result, data were obtained through interviews with the *dais*.

Results

On average, untrained *dais* did not make contact with the pregnant woman until labor and delivery. Untrained *dais* also demonstrated a lack of awareness regarding risk factors for perinatal mortality. Although trained *dais* had a greater recognition of the need for antenatal care, they also had limited involvement during the antenatal period. In contrast, community health guides received specialized training in screening all pregnant women for risk factors, and they were active participants in the Risk Approach[2] during the antenatal period.

Of all the birth attendants, perinatal mortality occurred most frequently in deliveries attended by trained *dais*. This occurrence is due to the fact that families did not request their services for normal deliveries. Similarly, higher perinatal mortality rates among deliveries attended by medical professionals reflect late referrals of women with obstetric complications after unsuccessful attempts by birth attendants to deliver the baby at home. Medical professionals attended approximately 39% of deliveries within this population.

Table 3 on the following page presents perinatal mortality rates according to the type of birth attendant.

Conclusion

The authors note that a perinatal death is not recognized as a significant event by the *dai* and the community at large. The services of *dais* are only sought during abnormal or prolonged deliveries. This article highlights the need to

[1]The nature and content of the government training program was not discussed in this article.

[2]The *Risk Approach* was developed in 1982 by the World Health Organization to classify women into risk categories based upon characteristics (primarily during pregnancy) thought to be associated with poor pregnancy outcome. This triage of care allows women classified as high risk to receive timely monitoring and treatment of medical conditions from health professionals (Backett et al., 1984).

Table 3—Perinatal Mortality by Type of Delivery Attendant		
Delivery Attendant	% of all Deliveries	PMR) (per 1000
Self (i.e., pregnant woman)	1.2	52.0
Relative	49.0	35.1
Untrained *dai*	2.6	97.6
Trained *dai*	4.4	58.0
Trained Community Health Guide	4.2	15.2
Nurse	33.1	40.4
Doctor	3.2	176.5
Specialist	2.4	297.3

Adapted from Pratinidhi et al., 1985

educate the community on the role of *dais* in preventing perinatal mortality through delivery assistance and timely referral of mothers and infants with complications.

Commentary

While much of risk factor analysis in perinatal mortality research focuses on women's characteristics, the intervention literature focuses on (1) the training of formal and informal health sector providers, (2) syphilis control, and (3) essential newborn care. The emphasis on these three issues within the literature supports a general sentiment that poor quality of obstetric care is a major culprit of perinatal mortality. Although quality of care is an important factor in determining pregnancy outcome, the community's perceptions of *dais* and medical professionals also compromise pregnancy outcome. This situation is particularly relevant in areas where the majority of births occurs outside of the formal health sector (as it does in this study area).

Few perinatal mortality intervention studies exist within the published literature, and even when such studies are published, they are not explicit in terms of study methodology and intervention content. This particular study is no exception. For example, it does not discuss selection and training of interviewers, nor does it describe the government training program in detail. Although this article is limited in its discussion of the training program, it does highlight the need to assess the health-seeking behavior of the community when evaluating a program's effectiveness. This assessment may be achieved through qualitative means (e.g., focus groups, in-depth interviews).

A previous issue of ***MotherCare Matters*** (1(4), 1991) has described the Risk Approach as a method of predicting perinatal mortality during the antenatal period. However, neither *dais* nor medical professionals come in contact with pregnant women during the antenatal period in rural Sirur. They are only sought when complications arise during delivery. Community health guides, who receive specialized training in both antenatal and delivery care, only oversee 4% of all deliveries. Therefore, there is a need to generate demand for obstetric care (beyond the treatment of complications) within the community. In theory, additional training of traditional birth attendants (TBAs) could reduce perinatal mortality; however, it is necessary to address the social, economic and cultural barriers to access of formal services, which, in turn, impede program impact.

In addition to the content and quality of interventions aimed at reducing perinatal mortality, equal attention must also be given to the evaluation of intervention programs. An article by Bobadilla (1992) summarized various methodologies used in the evaluation of maternal health programs (reviewed in ***MotherCare Matters*** 6(2), 1997). One of the most robust study designs is the quasi-experimental, pretest-posttest study design in which selected indicators are compared between two groups of mothers— one of which receives the intervention— before and after the intervention.

For example, Hira et al. (1990) evaluated the effectiveness of community health education and prenatal syphilis screening in reducing poor pregnancy outcomes in Zambia using a pretest/posttest study design (reviewed in

MotherCare Matters 1(4), 1991). Pregnancy outcomes (i.e., spontaneous abortion, stillbirth, prematurity, and low birth weight) were compared between intervention and comparison groups. Fauveau et al. (1990) also employed a similar quasi-experimental study design to evaluate a community-based program in Matlab, Bangladesh (reviewed in ***MotherCare Matters*** 1(2-3), 1990).

Without documenting perinatal mortality before and after program implementation, one cannot draw conclusions regarding program effectiveness with a high degree of confidence. Likewise, in order to assess secular trends and avoid erroneous conclusions regarding program impact, a population that is not exposed to the intervention must also be observed during the same period as the intervention group.

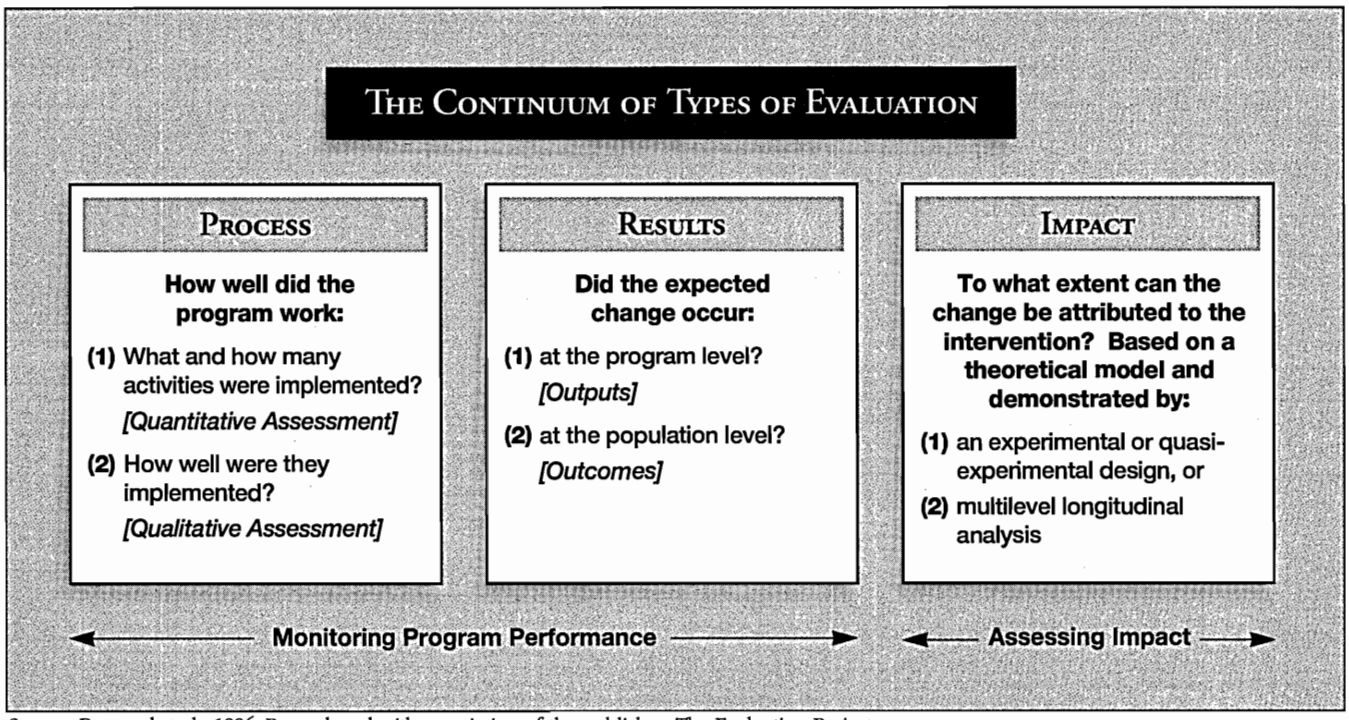
Evaluation research may entail much more than assessing changes in health outcomes. Researchers must choose whether to focus on (a) program monitoring[3] or (b) impact assessment,[4] and select indicators and methodologies accordingly. Figure 1 illustrates the continuum of evaluation as described by Bertrand et al. (1996).

Through program monitoring, evaluators may assess resources used, provider training, magnitude and quality of services, and service utilization. An impact assessment would allow the researcher to determine the degree to which changes in the aforementioned factors are due solely to the intervention. Similar indicators may be used in monitoring a program and assessing its impact.

The following indicators could have been used in the evaluation of the *dais* training program.

- ✦ number/proportion of *dais* who underwent the government training program
- ✦ number/proportion of *dais* who passed an exam that tested their knowledge/skills in labor and delivery care

Figure 1



Source: Bertrand et al., 1996. Reproduced with permission of the publisher, The Evaluation Project.

[3]*Program monitoring* entails assessment of program activities and performance (Bertrand et al., 1996).

[4]*Impact assessment* determines the degree of change in an outcome (e.g., perinatal mortality) that may be attributed to a particular program or intervention (Bertrand et al., 1996).

- number/proportion of *dais* who performed tasks competently after a designated amount of time post-training (e.g., six-months, one-year)
- number/proportion of deliveries attended by *dais*
- perinatal mortality rate
- stillbirth rate
- early neonatal mortality rate
- number/proportion of complicated deliveries that are referred by the *dais* to the district hospital or other health facilities

The distinguishing factor between the two types of evaluation is the methodology employed. Program monitoring documents changes within the community. Either a pretest-posttest study design or a time series design[5] would achieve this objective. However, time series studies require access to regularly collected data (Fisher et al., 1991). Such data did not exist in this community-based *dais* training program.

In contrast to program monitoring, the impact assessment determines causality (in this instance, can observed changes in the PMR be attributed to the *dais* training program?). In order to infer causality, data obtained prior to program implementation (i.e., baseline), and after program implementation are needed from both intervention and comparison (i.e., non-intervention) communities. Fisher et al. (1991) describe this method as a *nonequivalent control group design* and note that it is particularly useful in training programs. In using this design, special attention should be paid to baseline differences between the intervention and the control groups since these differences may assist the evaluator in explaining differences in posttest outcomes. In evaluating the *dai* training program, the researchers could have selected a similar rural population in which *dais* did not receive training. However, when interpreting results, the researchers should acknowledge potential biases that may explain outcomes (e.g., pregnant women from neighboring populations may have relatives who reside in the intervention community, and thus may be exposed to the intervention).

In conduction an evaluation, decisions regarding sources of data will depend upon the accuracy and completeness of those sources within a particular context. In this study, data were obtained from interviews with the *dais*. Because a *dai* has the potential to supervise many deliveries over a period of time, she may be unable to accurately recall events pertaining to a particular case. In addition, the accuracy of her reports is a function of the amount of time that has elapsed between the delivery and the interview. Given that most *dais* are illiterate, it is not feasible for them to maintain records of each pregnancy and delivery. One means of reducing the threat of recall bias is to increase the frequency of inquiries (e.g., conduct weekly interviews as opposed to monthly or bi-monthly interviews), or conduct a community surveillance with the aid of key informants.

Although accuracy and reliability of a data source may vary over time, the same sources of data should be used to calculate indicators before and after implementation of the program. In doing so, one reduces the likelihood that observed changes in perinatal mortality may be attributed to differences in the way it was measured, rather than to the program itself.

[5]A *time series study design* is similar to a pretest-posttest design, with the addition of repeated measurements before and after the program (Fisher et al., 1991).

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Anganwadi Worker's Participation in Rural Newborn Care

SR Daga, AS Daga, RV Dighole and RP Patil (1993). Indian Journal of Pediatrics 60:627-630.

Introduction

In an effort to create a referral system in which high-risk neonates could receive medical attention from trained medical personnel, the role of the anganwadi worker (AWW) was broadened in India. The traditional role of the AWW is to ensure birth registration, promote breastfeeding, and monitor growth the first three years of life. In this study, the AWW also assists the *dai* and community health worker in (1) the thermal maintenance of lower risk neonates within the community, and (2) the referral of high risk neonates to health facilities.

The purpose of this study was to assess the effectiveness of a training program that taught AWWs how to bridge the gap between the *dai* and the health worker in rural Maharashtra, India.

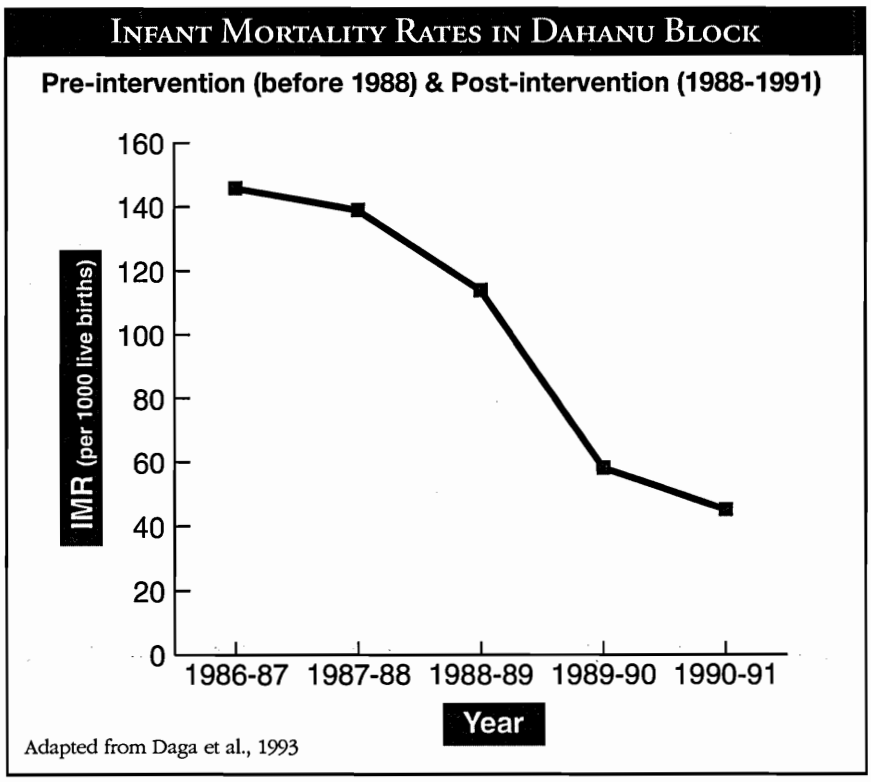
Methods

In 1988, the authors conducted a prospective study in Dahanu Block (Maharashtra) to assess activities of AWWs. The actual intervention entailed monthly in-service training on the block or primary health center (PHC) level and practical instruction during field visits. Special emphasis was placed upon the prevention, detection and treatment of hypothermia. More specifically, the AWW was to help the *dai* in identifying and referring a very small baby (foot length < 6.5 cm), and monitor the progress of a borderline preterm/low birth weight baby (foot length 6.5-7.0 cm) by making regular home visits. During these home visits, she would look at whether (1) the baby was breastfeeding well, (2) s/he was active, and (3) the soles of his/her feet were warm and pink. During the practical training sessions, the AWWs learned specific techniques in detecting hypothermia and rewarming the baby.

Results

Both overall MCH service performance and infant survival improved during the study period. Program impact was sustained during the two-year follow-up period after the intervention

Figure 2



Adapted from Daga et al., 1993

had been implemented. The infant mortality rate (IMR) decreased from 145.7 per 1000 in 1986-87 (pre-intervention) to 45.1 per 1000 in 1990-91. As seen in Figure 2, reductions in infant mortality actually began prior to program implementation. However, the rate of decline appears to have increased upon initiation of the program.

Birth registration also improved during the study period, and more beneficiaries for immunization were identified through the work of AWWs. In addition, the AWWs were critical agents in increasing antenatal care utilization, and hospital referrals from both the home and the primary health center showed a two-fold increase between 1988 (year of program initiation) and 1990.[1]

Conclusions

The authors note that aspects of newborn care could be included in the training of AWWs without modifying the teaching schedule or increasing the length of training. In the process of providing specialized care which improves neonatal survival, AWWs also improve communication between *dais* and community health workers.

Commentary

Although this intervention study does not target perinatal mortality specifically, it addresses thermal regulation, which is critical to early neonatal survival. Thermal regulation of the neonate is rarely explored in the literature, despite the fact that it also reflects the quality of immediate newborn care.

Another merit of this article is its detailed description of the AWW training program (e.g., trainers, frequency and content of the training, and the role of the AWW). In this setting where home deliveries predominate, the AWW ensures that the neonate makes contact with the health system on the day of delivery. Early contact with the neonate has implications that extend far beyond the perinatal period (e.g., less resistance from the family for immunizations). In addition to providing potential benefits for neonatal survival, the AWW also assists in the maintenance of updated and complete vital records (though the degree of ascertainment of stillbirths is not known). As a result, vital records may be a viable source of data within this population.

In order to effectively critique the accuracy of perinatal statistics derived from vital registries, it is important to determine whether the vital registration system is truly equipped to document perinatal deaths. For example, one must determine if there are specific forms or specific items allotted to the documentation of both stillbirths AND early neonatal deaths. Because the AWW devotes much of her attention to the neonate, the degree of stillbirth ascertainment should be assessed before using her records to estimate perinatal mortality.

[1]The article did not present data on hospital referrals prior to the implementation of the training program.

With respect to evaluation methodology, this study did not compare outcomes of the intervention community with outcomes of a comparable community that did not receive the intervention. Because declines in infant mortality began prior to implementation of the AWW training program, it is not possible to attribute changes in infant survival to anganwadi training.

As stated earlier in this issue, an impact assessment must be conducted in order to determine the degree to which the AWW training program contributed to the observed decline in infant mortality. Numerous approaches exist to test program impact. The following are criteria taken from guidelines by Bertrand et al. (1996) to assist researchers in selecting evaluation methods:

- ✦ Exposure to threats to validity[2]
- ✦ Required Assumptions
- ✦ Ability to Isolate Program Effects
- ✦ Cost
- ✦ Data Requirements
- ✦ Types of Outcome Indicators Used
- ✦ Technical/Statistical Skills and Resources Required

According to Fisher et al. (1991), factors such as *history bias* (i.e., events not related to the intervention affect the outcome(s) of interest), *selection bias* (i.e., the comparison group differs substantially from the intervention group on characteristics which may affect the outcome), and *instrumentation bias* (i.e., the ways information was collected before and after the intervention differ) may threaten the validity of study. In addition, some evaluation methods may require strong assumptions that are not valid in actual practice. **An evaluation method that has few assumptions, requires few financial and human resources, and allows the researcher to distinguish intervention effect from other factors is highly desirable.**

Given these issues, the researchers in this study could have employed a quasi-experimental design to test the effect of the AWW training program on infant and neonatal outcomes. Although additional costs are incurred in tracking changes in infant mortality for both intervention and comparison communities before and after an intervention, costs may be minimized if existing data sources (e.g., vital records) are used. Valid and reliable sources of data are difficult to obtain within a community setting. The authors do not mention whether AWWs documented their home visits, though such records could also be used as a source of evaluation data.

Selection of study indicators is also important in evaluation methodology. Although the AWW plays a critical role in neonatal care, the authors report infant mortality statistics instead of neonatal indicators. The absence of neonatal indicators limits our ability to assess the program's effectiveness in improving neonatal survival. As a result, it is unclear whether favorable changes in the IMR resulted from improved immunization coverage, the AWW training, or other interventions that may have occurred.

Because the AWW comes in contact with the infant shortly after delivery, more appropriate study indicators include the neonatal mortality rate, the early neonatal mortality rate, and first-day mortality. Although morbidity is more difficult to assess than mortality, indicators reflecting neonatal morbidity (e.g., diarrheal disease incidence) would be helpful in this evaluation. Hospital referral rates and rates of early exclusive breastfeeding are also specifically related to the AWW's scope of work.

Unlike many published intervention studies, this article outlines specific components of the AWW training program. As a result, numerous process indicators may be derived for the purposes of evaluation. For example, the evaluation team could assess the competency of the AWW in achieving specific tasks (e.g., assessing the size of a baby from his/her foot print, checking the soles of the baby's feet for normal pallor and warmth) at various points before and after training. In addition to evaluating AWWs' skills, evaluators should also assess the adequacy of the training program itself (e.g.,

[2] *Validity* refers to the degree to which an indicator measures what it is intended to measure (Bertrand et al., 1996).

appropriateness of training materials, proportion of training curriculum spent on specific topics/tasks, frequency and duration of training sessions, and trainers' teaching skills).

In the article, the authors also state the expenditure per anganwadi (estimated Rs. 110). Therefore, a cost-effectiveness analysis could be conducted in order to supplement process and outcome evaluations. In addition to assessing supply-oriented factors, evaluators could use qualitative research techniques (e.g., focus groups, in-depth interviews) to assess whether the community's perception of AWWs changes with improvements in AWW skills. In this fashion, both supply and demand factors can be taken into account when evaluating program effectiveness.

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COMMENTARY

In summary, the following lessons were learned from the studies reviewed in this newsletter:

- **Demographic surveys are reliable sources of perinatal statistics.**
- **Truncated pregnancy histories yield perinatal statistics that are of comparable quality to statistics derived from pregnancy histories that document a woman's entire reproductive life (i.e., *"full"* or *"complete" pregnancy histories*).**
- **Overlapping samples of perinatal deaths and survivors of the perinatal period increase a study's power and provide detailed information on survivors that can be used beyond estimation of PMR (e.g., in statistical analyses which explore risk factors for perinatal mortality).**
- **More robust methodologies (e.g., the non-equivalent control group pre-test/post-test design) are needed in perinatal mortality intervention research.**
- **Evaluation methodology and selection of evaluation indicators are as important in assessing intervention effectiveness as the intervention itself.**
- **Although a program may be efficacious in reducing mortality, aspects of the community such as birth practices and careseeking behavior may affect its effectiveness. As a result, these issues warrant attention in future studies through qualitative research methods.**

The epidemiological studies reviewed in this issue of ***MotherCare Matters*** are large-scale, population-based studies that are not representative of the general literature on perinatal mortality. Despite the need for studies that document vital events in both health facilities and the broader community, such "hybrid" studies are rare. The two epidemiological studies reviewed in this issue rely primarily upon interviews as the source of perinatal data. However, other published studies that have assessed perinatal mortality in the community often cite community surveillance, key informants, and verbal autopsies as sources of data.

With respect to perinatal mortality interventions, poor research methodology compromises our ability to observe the impact of many programs. The selection of study indicators is also of importance, and investigators must be clear about whom they include in their numerators and denominators when calculating rates. In addition, researchers must determine whether they want to assess program effectiveness based upon process indicators such as provider knowledge, skills, and practices, or outcome indicators such as the perinatal mortality rate. Although the ultimate objective of any intervention is to improve the health outcome(s) of interest, there is also a need to conduct process evaluations, particularly as quality of care moves to the forefront as a major topic in perinatal research.

Although studies vary substantially with respect to their methodologies, most intervention studies are community-based studies with small sample sizes. This fact should not be surprising, since study recruitment within the community is more difficult than within health facilities. However, small sample size may limit the types of indicators that are studied because of the small number of perinatal deaths.

Findings from Pakistan and Jamaica demonstrate the utility of demographic surveys in estimating perinatal mortality and will probably pave the way for subsequent population-based studies with pregnancy history data in other contexts. However, there is still the need to balance the appeal of large-scale studies with the needs of a health practitioner in a developing country. Although studies that employ traditional techniques in data collection have contributed to our body of knowledge regarding perinatal mortality, we must develop alternative (e.g., qualitative), low cost, rapid assessment techniques that can be easily implemented in community settings by community members and health providers with adequate training. Although large scale studies can provide the answers to "what" is happening, they are not helpful in exploring "why" it happens.

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MotherCare™ Matters

A QUARTERLY NEWSLETTER AND LITERATURE REVIEW ON MATERNAL AND NEONATAL HEALTH AND NUTRITION

LEARNING AND ACTION IN THE FIRST DECADE— THE MOTHERCARE EXPERIENCE

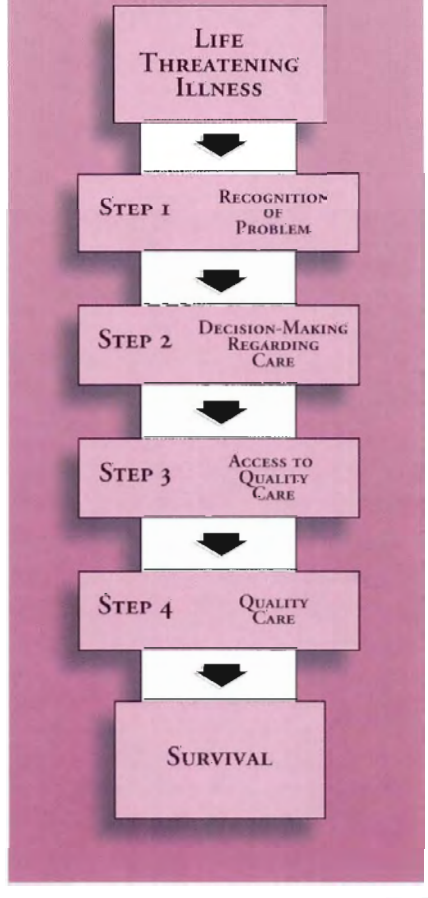
Introduction

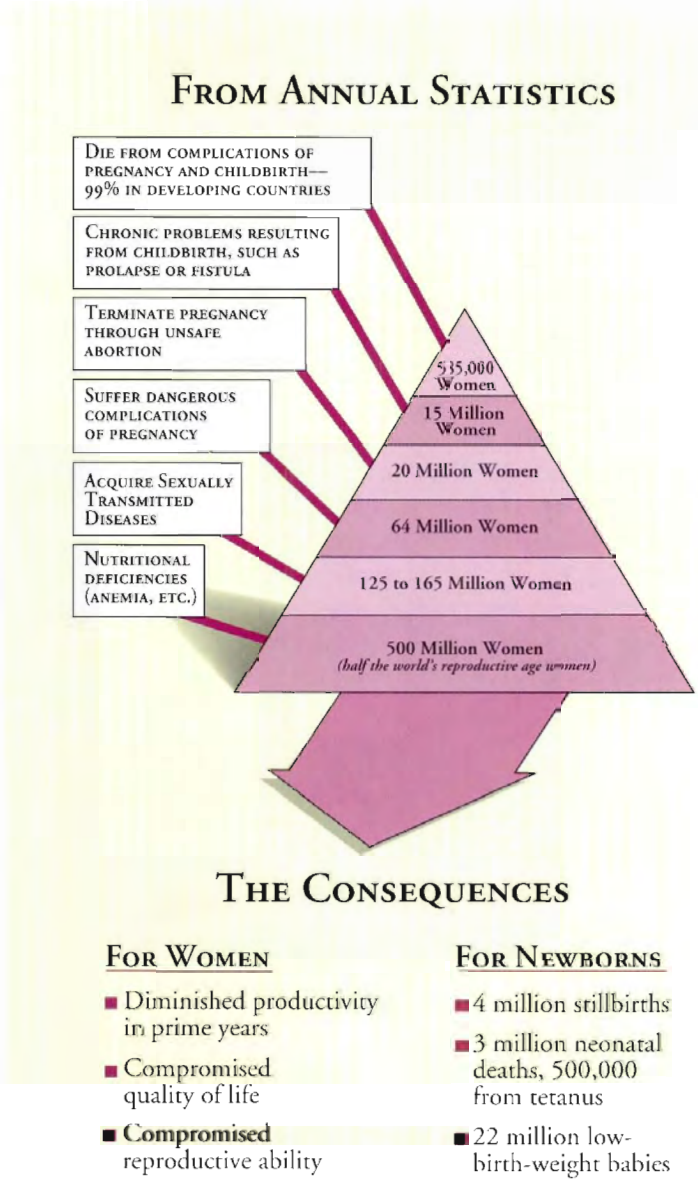
At the ten year anniversary of Safe Motherhood, the deaths of 600,000 women per year from pregnancy-related complications continue to challenge us. Millions more women suffer from morbidity associated with pregnancy, nutritional deficiencies, sexually transmitted diseases (STDs), and unsafe abortion (see Annual Statistics Pyramid, next page). MotherCare has been working since 1989 to improve maternal health and reduce these high levels of morbidity and mortality.

To this end, MotherCare has outlined four steps that require attention to improve the chances for survival of the mother and her baby. This Pathway to Survival (see Figure 1) begins with recognition of the problem (Step 1) by the woman, her family and/or health providers who may not be equipped to manage the problem. The woman and her family need to decide to seek care (Step 2) and must overcome barriers to access (Step 3). Access issues such as cost, transportation, weather conditions, childcare and perceptions of how the woman will be treated influence whether or not the family will decide to seek care. The final step is the actual quality of care (Step 4) provided to women. MotherCare interventions aim to improve each step along this pathway.

Within this framework, MotherCare has conducted quantitative and qualitative research to identify barriers to survival and improved health, and feasible interventions to overcome them. This research has influenced MotherCare to target its efforts in three areas: 1) improving **quality of care**; 2) **changing behaviors** of health providers, families, and communities; and 3) supporting **policy formulation** and community mobilization. MotherCare's efforts to improve quality of care include building provider teams within and among levels of staff, providing in-service training to improve technical and interpersonal skills, and strengthening referral mechanisms. Health providers are taught **interpersonal communication and counseling (IPC/C)** skills to help them address women's needs. They use **information, education and communication (IEC)** materials with clients in explaining the danger signs of complications and work with them on plans

—FIGURE 1—
PATHWAY TO SURVIVAL





of action. By improving the flow of IEC in the community, it is expected that demand and utilization of quality services will increase. Promoting policy formulation and community mobilization allows programs to function in a supportive environment.

Over the last eight years, MotherCare has supported projects and research in over 20 countries around the world (see Box 1). Demonstration projects are being carried out in Bolivia, Guatemala, Egypt and Indonesia. In each of these countries, efforts are focused on a select population so that interventions can be adequately demonstrated and evaluated. In consideration of the unique circumstances of each community, MotherCare assesses health personnel and facilities as well as the community to identify needs, options, and feasible interventions. Based on findings of this research, MotherCare develops and implements various strategies to improve quality of care and change behavior with the purpose of improving maternal and newborn health and survival. Furthermore, each intervention is monitored and will be evaluated for effectiveness. Governments are the primary counterparts in each demonstration project, making it more feasible to adapt strategies and protocols designed within the projects to meet national and local needs.

MotherCare supports an integrated approach in other countries as well (as noted in Box 1), but not at the level of demonstration projects. Six applied research projects in Ghana, Uganda, Thailand, Peru and Indonesia address specific questions of the effectiveness of interventions or varying means of implementing known interventions. In other projects, targeted interventions — including anemia control, antenatal care, STD prevention and control, family centered maternity/neonatal care, and research and education on female genital mutilation (FGM) — address the means of implementation of these programs. Each of these projects has made significant contributions to MotherCare's understanding of what is necessary to achieve safe motherhood, or more broadly, reproductive health.

This special issue of ***MotherCare Matters*** highlights three demonstration projects (Section 1) and two applied research projects (Section 2) to illustrate how MotherCare's approach works in practice. To improve quality of care, the MotherCare/Indonesia Project focuses on midwives and aims to improve their technical and interpersonal skills. In contrast,

Bolivia and Guatemala have no trained cadre of midwives and therefore target efforts to improve quality of care with doctors, nurses, nurse auxiliaries, and traditional birth attendants. In all three demonstration projects, health providers are using IEC materials while counseling their clients. In the community, IEC strategies are aimed at increasing awareness of signs of complications, improving perceptions of health personnel and facilities, and helping families to plan for potential complications of pregnancy.

In Section 2, this issue describes two applied research projects and presents preliminary findings to show the impact of targeted interventions. In an effort to reduce maternal deaths due to unsafe abortion, MotherCare is supporting training of non-physician providers in postabortion care in Ghana with Ipas, the Ghana Registered Midwives Association (GRMA) and the Ministry of Health. In Uganda, MotherCare is supporting research to determine the effectiveness of an innovative approach to controlling STDs and genital tract infections (GTIs), particularly in relation to transmission to the fetus or newborn.

During this first decade of the Safe Motherhood Initiative, MotherCare has continued to learn from *doing* and has incorporated its lessons learned along the way. For example, we have learned that community involvement is essential to ensure that interventions are relevant to the cultural context. Moreover, it is clear from this decade of learning that safe motherhood requires a systems change that brings together levels of providers in a new way. It is also evident that this type of change happens slowly. MotherCare believes that applying these lessons learned to specific communities will lead us, step by step, toward safe motherhood.

Judith Heichelheim, Consultant, and Marjorie Koblinsky, Director

Box 1—MotherCare Project Countries

Integrated Reproductive Health Approach

Bolivia, Guatemala, Indonesia, Egypt, Pakistan, India, Honduras, Benin (essential obstetric care), Ghana (Postabortion Care)

Anemia

Malawi, Peru, India

Antenatal Care

Zambia (Adolescents), Thailand

Sexually Transmitted Diseases

Uganda

Family Centered Maternity/Neonatal Care

Russia, Ukraine, Moldova

Female Genital Mutilation

Guinea, Eritrea

Regional Projects

Latin America, Africa

SECTION ONE

MOTHERCARE'S INTEGRATED EFFORTS FOR IMPROVING MATERNAL HEALTH CARE—EXAMPLES FROM THREE DEMONSTRATION PROJECTS

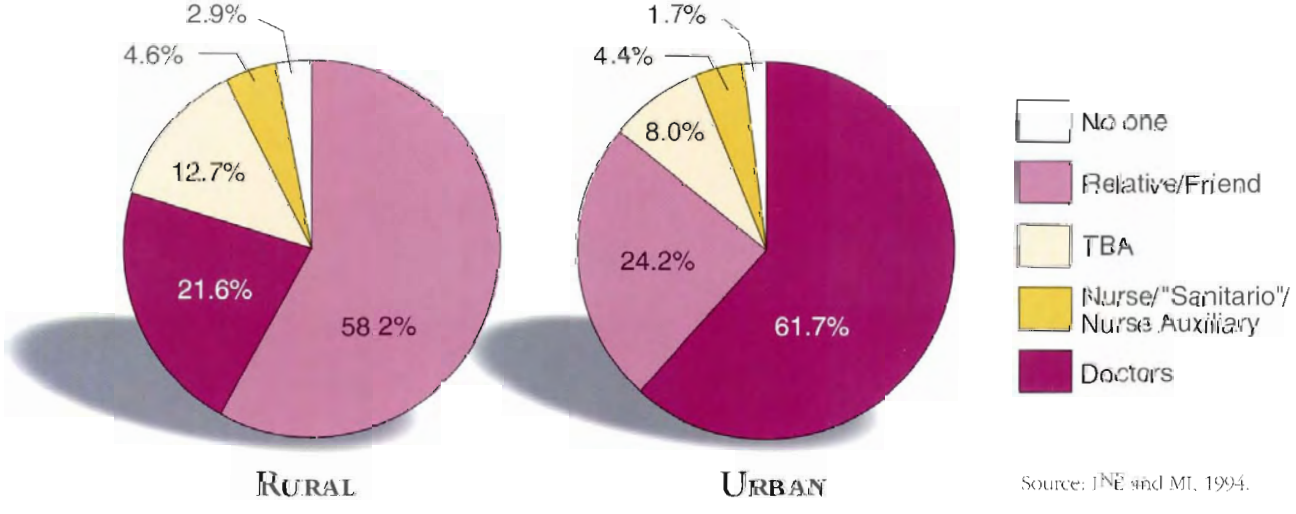
MotherCare/Bolivia

Introduction

It is widely recognized that Bolivia has one of the highest maternal mortality ratios in Latin America and the Western Hemisphere, with an estimated maternal mortality ratio (MMR) cited variously at 390 per 100,000 live births (INE and MI, 1994) or 650 per 100,000 live births (WHO/UNICEF, 1996). The main obstetric complications in Bolivia follow patterns from other countries, with nearly 50% being hemorrhage, followed by abortion at almost 25%. Lack of timely and adequate medical attention — a problem which can be easily prevented in most cases — causes the majority of maternal deaths. Approximately 50% of births are attended at home without the presence of trained personnel; this percentage rises to 75% in rural areas (See Figure 1 below) (INE and MI, 1994). A regional analysis of the situation shows that maternal mortality in the *altiplano* is three times higher than in the plains, and twice as much as in the valleys. The highest ratio is in the rural *altiplano*, where MMR reaches 887 per 100,000 live births.

Given these excessive mortality ratios, Safe Motherhood has received attention from the highest levels in Bolivia. In 1994, the government developed a national strategy, *Plan Vida*, to improve the quality of maternal and child health care. At the same time, the government implemented the law on Popular Participation, thus facilitating the decentralization of governance to the community level. This law has assigned resources and the implementation of health services to municipalities, generating new legal instruments for the distribution of funds. Twenty percent of the income from national taxes is distributed among municipalities, in accordance with their populations. With these funds, municipalities must cover health, education, sports and sanitation infrastructure. In July 1996, the government focused its efforts even more on improved maternal and child health with the promulgation of a national Mother-Child Insurance scheme covering the

FIGURE 1—DELIVERY ATTENDANT BY PLACE OF RESIDENCE



Source: INE and MI, 1994.

service costs of pregnancy, including hospital delivery, through the first five years of a child's life. Through this new initiative, 3% of the local budget is directed to the Mother-Child Insurance scheme.

Since 1994, MotherCare/Bolivia has worked collaboratively with the National Secretariat of Health to assist the national, district, and municipal governments in decreasing maternal and neonatal mortalities and morbidities. Intervention strategies aim to improve both the quality of services provided by government health staff at all levels and demand of access to services by the community. The MotherCare project is being carried out in five districts of Cochabamba and La Paz representing 18 municipalities. Tables 1 and 2 show select information on mortality levels and service coverage in the project areas.

Table 1

MORTALITY LEVELS AND SERVICE COVERAGE, BOLIVIA, 1989-1994

	La Paz	Cochabamba	Bolivia
Maternal Mortality Ratio (per 100,000 live births)	602	263	390
Neonatal Mortality Ratio (per 1000 live births)	37	47	41
Deliveries by trained attendant (%)	35	53	47
Antenatal care (%)	43	54	53

Source: INE and MI, 1994.

Enhancing Quality Services

Bolivia lacks neither health services nor providers (with the exception of very remote rural areas), yet it suffers a high ratio of maternal mortality. Similar to many Latin American countries, Bolivia does not have a clinical midwifery cadre available; women deliver at home with a family member or in a health facility with a doctor. There is severe under-utilization of health services; in Cochabamba, the second largest city of Bolivia, about half of the women deliver with a trained provider, but in the capital city, La Paz, only about a third do so. Clearly, many women, even in urban areas, deliver at home — often without any attendant except a family member.

Based on quantitative and qualitative research to determine knowledge, attitudes and prac-

Table 2

ANNUAL STATISTICS OF PROJECT DISTRICTS, 1996

	District	Total population	Women of childbearing age	Pregnancies	Births	Children less than one year	Providers		
							ObGyn	Nurse	Aux. Nurse
Cochabamba	Capinota	44,041	10,702	1,916	1,756	1,430	0	3	12
	Quillacollo	270,118	65,639	11,995	10,997	9,216	7	17	68
	Sacaba	106,700	25,928	5,317	4,874	3,832	2	4	19
	Total	**420,859**	**102,269**	**19,228**	**17,627**	**14,478**	**9**	**24**	**99**
La Paz	Il de El Alto	143,800	36,381	4,138	3,793	4,301	5	12	64
	Santiago de Machaca	90,882	22,993	3,127	2,866	2,329	1	5	41
	Total	**234,682**	**59,374**	**7,265**	**6,659**	**6,630**	**6**	**17**	**105**
General Total		**655,541**	**161,643**	**26,493**	**24,286**	**21,108**	**15**	**41**	**204**

Source: MotherCare/Bolivia, 1997.

Antenatal Care Clinic with Nurse Auxiliary, Bolivia.

tices surrounding pregnancy (MotherCare and Marketing S.R.L., 1996), MotherCare identified gaps in service utilization and determined that change needed to happen both in the way health services are being provided as well as in the perceptions and practices of the communities using these services. Through this process, MotherCare identified unique cultural practices and beliefs of the Quechua and Aymara peoples who comprise a high proportion of the populations in the intervention areas. Specific service delivery changes that could make health services more appealing and accessible to these populations were also identified (See Box 1).

One significant finding was that the Quechua and Aymara place great emphasis on "hot" and "cold" aspects of pregnancy and delivery. Whereas hospital delivery rooms traditionally are kept cool and ventilated, Quechua and Aymara women desire a warm environment for delivery because they believe it helps the infant to move downward. Identifying other cultural customs stimulated modification of the behaviors of health providers so that women would feel more comfortable using these services (See Box 1).

Complementing this effort to change behaviors, health providers are receiving **competency-based clinical training** not only in managing obstetric, neonatal and post-partum complications, but also in **interpersonal communications and counseling (IPC/C)**. To develop a training curriculum, MotherCare joined the National Secretariat of Health in the development of practice protocols for handling obstetric and neonatal complications at first (health posts and health centers) and second (district hospitals) level facilities.[1] These unique protocols include both clinical and counseling guidelines on how to treat and counsel women and newborns.

Based on the protocols, MotherCare developed a competency-based curriculum and established two training centers. A network of capable trainers (doctors and nurses) was trained to provide on-going training through both hospital-based training courses plus supervision in the field. MotherCare's integrated strategy for the delivery of maternal health services is reflected in this curriculum which includes anemia and syphilis control during prenatal care, and the provision of counseling in postpartum family planning, including lactational amenorrhea method (LAM). Doctors, nurses and auxiliaries are being trained at the first and second levels to implement the practice protocols. Simultaneously, efforts are being made to define strategies that will guarantee the regular distribution of supplies needed to manage normal and complicated obstetric and perinatal cases.

[1] Ministry of Human Development, National Secretariat of Health and MotherCare/Bolivia (October 1996). *Care for Women and the Newborn in Health Posts, Health Centers and District Hospitals*. La Paz, Bolivia. Bolivian Health Norm NB-SNS-02-96.

Maternal anemia has received special attention in Bolivia. A baseline study in 16 health districts suggests that anemia among pregnant women is high. Moreover, data from the five MotherCare districts imply that few pregnant women receive iron pills, and those women receiving pills do not always take them as recommended by health providers. In response to these findings, the anemia component of the project builds on the existing National Iron Supplementation Program, going beyond the training mentioned above to ensure adequate distribution of iron pills at the community level.

Box 1—Integrating Cultural Practices Into Health Delivery Systems

"We want health providers to be more culturally sensitive. In the [qualitative] study we asked them: what are the five things you could incorporate into your services so you are more culturally sensitive? One is to return the placenta; the second one is to keep women very warm; third, the women want their husbands to be with them. They also want the TBAs, or if there is no TBA, the mother-in-law... someone else to be with them. And finally ... the hardest [to accept] ... is that she [the woman] can choose the position in which she will deliver."

Veronica Kaune, Health Education/Communication Specialist, MotherCare/Bolivia

MotherCare is seeking to improve iron pill coverage through alternative means of distribution using community-based personnel including TBAs, health promoters and teachers.

Based on results of qualitative research, improvements are also being made in the messages and counseling provided to women about taking iron pills and the consequences of anemia. **Information, education, communication and counseling (IEC/C)** materials have been developed for women and health providers and are being used in a pilot project in the five MotherCare districts. These materials focus specifically on the importance of iron supplementation during pregnancy and include a flipchart for health workers to guide them in discussing anemia with clients. A chapter of the radio soap opera (see Box 2) emphasizes proper use of iron tablets and the importance of controlling anemia among pregnant women.

Like anemia, syphilis has also received special attention. In a 1996 study of pregnant women and newborns in seven hospitals, 4.3% of women with live births and 26% of those delivering stillborns were found infected with syphilis; 5% of newborns of mothers with syphilis presented signs of syphilis at birth (Southwick et al., 1997). Given these findings, MotherCare is contributing to the planning and development of an intervention strategy in support of a national policy to decrease maternal syphilis and prevent congenital syphilis in Bolivia. The national policy, to be articulated by the National Secretariat in late 1997, will support detection and treatment of syphilis in women during pregnancy and in newborns as a means of reducing perinatal mortality and morbidity. A training manual on the prevention and control of syphilis in maternal and child health programs[2] has been adapted from MotherCare's work in Kenya (Jenniskens and Obwaka, 1994) and validated in the Bolivian context. The training includes lessons to equip health providers with treatment methods, IPC/C skills and clinic-based skills to conduct antenatal syphilis screening using the RPR card test. Training sessions are designed to involve health providers from a variety of backgrounds in counseling and technical areas.

Addressing Critical Behaviors

MotherCare/Bolivia's behavior change strategy aims to increase the use of maternal and neonatal health services through the promotion of "courteous attention to the mother" and greater emphasis on the family. Issues of access are being addressed through a **community-based IEC/C approach** to increase community awareness of the danger signs of pregnancy, labor and delivery, and appropriate and timely actions. Through a local graphics/media

[2] Brady, William et al., eds. (August 1996). *Training Package for Prevention and Control of Syphilis in Maternal and Child Health Programs.* MotherCare, John Snow, Inc., Arlington, VA.

Box 2—Reaching Communities Through Radio Programming

"During this time, working in the health center, I have attended many women who come in with pregnancy complications, and most of the time with problems that could have been prevented. And I think that the problem is that many of these women and their families don't know how to recognize these complications early in the pregnancy -- problems such as bleeding, swelling, los ataques [fits], la wawa trancada [breech baby] and sobreparto [a postpartum complication that consists of body pain and chills, sepsis]. And it is the same with their babies, the newborns; they don't bring them in early when they are yellow, purple, skinny or have an infection. And many times the problem is that they didn't decide early enough to come here where we can attend them, or because they didn't consider transportation or costs.

Of course here in the health center there are also problems. Luisa is constantly struggling with the doorkeeper, Don Simon, to try to get him to treat the people with respect, and I am doing the same with Bladimir. And Luisa and I are always trying to get people to understand that they have rights here and that they ought to demand them."

—Isabel, "Diario de un Destino"

One essential element of the Bolivia IEC/C strategy is the radio soap opera, "*Diario de un Destino.*" It forms part of a larger IEC/C effort and serves to educate and break down misperceptions through an accessible and entertaining medium. In this way, maternal health can truly start at home and in the community.

organization, Hipnosis, IEC/C materials (e.g., posters, flyers, and calendars) are being distributed and a 60 chapter radio soap opera (see Box 2) on maternal health is being broadcast.

Policy Formulation

Efforts of the MotherCare Project have already impacted policy in Bolivia. The treatment protocols have been distributed by the National Secretariat of Health as standards of practice to public sector health providers, international organizations, and nongovernmental organizations (NGOs) throughout the country. Additionally, national policy has been formulated in response to the findings of the syphilis study.

Cost models that can be applied at the district and municipal levels are being developed to aid in the formulation of policy. With the World Health Organization (WHO), MotherCare is calculating the cost estimates of the WHO Mother-Baby Package Cost Model for "ideal" treatment according to Bolivia's protocols versus "actual" cost of treatment. In addition, MotherCare/Bolivia, with Partnership for Health Reform, is conducting a second study of actual costs of MotherCare interventions which could be replicated in other municipalities.

Monitoring and Evaluation

A monitoring and evaluation plan has been developed to ensure that efforts to increase use of services and improve quality of care, such as training and IEC/C materials, are implemented well and achieve specific outcomes. To this end, the MotherCare intervention area (implementing all IEC/C, training, and policy strategies) will be compared to a control area (implementing only IEC/C strategies with MotherCare assistance). At the end of the project, data collected in the intervention and control areas will be compared using 15 key indicators. These 15 key indicators will be measured through a facility-based monitoring system focusing on the quality of prenatal, delivery and postpartum services as well as a community-based approach to capture client perspectives. Service indicators will be collected through National Health Information Systems (NHIS) reports, clinical histories, registers and facility-

based survey data; client perspectives will be collected through client exit interviews and a population-based survey.

Conclusion

The strength of the National Secretariat of Health and MotherCare/Bolivia plan lies in the integration of key components into reproductive health service delivery and the recognition of the need to involve communities, health providers and policymakers at all levels. MotherCare participates in the Technical Working Group for the First Ladies of the Americas and attended the First Ladies Meeting in December 1996 to support the First Lady's initiatives in maternal mortality reduction, adolescent health care and maternal nutrition. MotherCare collaborates with the National Secretariat to promote policies to sustain quality integrated reproductive health services, including a model of care for handling maternal and neonatal morbidity and mortality in the five project districts; protocols for treating obstetric and neonatal complications; and protocols for integrating syphilis screening and treatment into antenatal services. MotherCare is also assisting the National Secretariat in the review and revision of National Health Information Systems to improve the data available on maternal and perinatal mortality and morbidity. Protocol development, policy implementation, training, interpersonal communication, and IEC/C are all essential to reaching the objectives for safe motherhood in Bolivia.

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MotherCare/Guatemala

Introduction

The maternal mortality ratio (MMR) in Guatemala is 200, the third highest in the Western Hemisphere after Haiti and Bolivia (WHO/UNICEF, 1996). In some areas, particularly in the *altiplano* (highlands), the ratio is as high as 446 per 100,000 (MSPAS, 1989). Many women in Guatemala continue to deliver at home with a traditional birth attendant (TBA) or family member. The government has supported efforts to reduce maternal and neonatal mortality and make services more accessible to communities in remote areas.

From 1990 to 1993, MotherCare I carried out a demonstration project in the Quetzaltenango Health Area through the *Instituto de Nutrición de Centroamérica y Panamá (INCAP)*. During this project, TBAs were trained to recognize and refer obstetrical and neonatal complications. All hospital staff — from the gatekeeper to the physician — were encouraged to welcome the TBA and allow her to remain with her patient. MotherCare II built on lessons learned in Quetzaltenango to replicate and expand successful activities into five other health areas of the *altiplano*. MotherCare continues to work in Quetzaltenango and, since September of 1994, has been working in the health areas of Sololá, San Marcos and Totonicapán, adding the Retalhuleu and Suchitepequez areas in 1997. Tables 1 and 2 provide select information on mortality levels in service coverage in three of the health areas. The overall efforts of MotherCare in the *altiplano* comprise an integrated approach to training, service provision and community activities; this model is already being adapted for five more areas of Guatemala through funds from other donors and may be appropriate for the remainder of the country as well.

MotherCare assistance in Guatemala aims to: 1) improve the **quality of services** through technical competency and interpersonal communication and counseling (IPC/C) training at all levels; and 2) **mobilize communities** by heightening awareness of maternal neonatal health needs through an information, education and communication (IEC) strategy, working with women's organizations and supporting community maternities as an alternative to normal delivery at home or at the hospital.

Improving Quality of Care

The infrastructure to provide hospital obstetrical care in Guatemala is limited, and the government currently is not able to expand its capacity to accommodate uncomplicated births. Even when complications are referred, hospital care is sometimes inadequate and care is not usually given in a way that is culturally acceptable to the Mayan people. In addition to these facility-based barriers, many women face geographic and economic barriers to accessing hospitals. Especially in the rural regions, hospitals are few and far between, and in the mountainous areas, roads are poor and families may not have access to transportation, especially at night.

Since formal midwifery education was abolished 20 years ago in Guatemala and few midwives are available for care, women must either

Table 1

MORTALITY LEVELS AND DELIVERY COVERAGE, GUATEMALA 1995

Category	Guatemala
Maternal Mortality Ratio (per 100,000)	220
Neonatal Mortality Ratio (per 1,000)	29
Deliveries at health services (%)	34
Deliveries at home (%)	65
Deliveries by doctor (%)	10 (indigenous population) 31 (total population)
Deliveries by TBA (%)	72 (indigenous population) 55 (total population)

Source: INE et al., 1995.

Table 2

Coverage by Health Providers (1994-95) and Maternal Mortality Levels (1989) in Three Project Districts			
Category	**San Marcos**	**Sololá**	**Totonicapán**
Population*	645,418	222,094	272,094
ObGyns**	1	0	0
Nurse Auxiliaries**	251	162	191
TBAs**	1,400	700	750
Maternal Mortality Ratio*** (per 100,000)	446	289	195

Source: * INE, 1995. ** Ortiz and Bocaletti, September 1994. Data on Retalhuleu and Suchitepequez are not complete at this time. *** MSPAS, 1989.

deliver at home or in hospitals where facilities are limited. Thus TBAs and families play the crucial role of identifying complicated cases and referring them to obstetric services in the hospital. Based on previous experience, MotherCare has learned that training TBAs does not ensure improved referral; families, plus physicians and nurses must also be trained so that improvements can be made at all levels of the delivery system.

Qualitative research carried out in communities and hospitals has identified barriers to using hospital services. As mentioned above, geographic and economic obstacles exist, but there are also significant barriers based on practices of health personnel and institutional management. For example, hospitals were not allowing families or TBAs to enter with pregnant women because they were concerned that the hospital environment would not remain clean. However, qualitative research showed that women wanted to have family members with them at the hospital, and TBAs were more likely to refer patients if they could remain with them throughout the delivery. Some hospitals have begun to provide chairs in the corridors so family can stay near the patient, and hospital health providers are trained to treat the TBA with respect when she brings her patient to the hospital.

Another example of the disparity between hospitals and communities can be found in issues of physical modesty. Women in these rural communities virtually never remove their skirts; yet in the hospitals, not only do providers insist that they remove their skirts, but a number of health personnel may be present during the hospital examinations and procedures making the woman feel embarrassed and ashamed in this foreign environment. Understanding these perceptions has led to a restructuring of hospital obstetric services so they will be more culturally appropriate.

To improve the quality of maternal care, health personnel not only need to understand the cultural beliefs and barriers that their clients face, but they also need to modify their skills — both technical and interpersonal — in providing care. Under the Quetzaltenango project, norms and protocols for the management of maternal and neonatal complications at the health center and at the hospital were established, and medical and paramedical staff were

"We know that some women are taken to the hospital, but others, especially in the far away communities, are not. When we see the factors constraining them we realize the immense task we have, because factors can be the distance for isolated communities—roads are terrible; especially during the rainy season, roads are muddy. Sometimes there's not even transportation, regular transportation, especially at night. I don't know if more emergencies occur at night. But that's when people may have complications, and people wait until it's dawn. I have so many testimonies that say 'we decided to wait.' It's hard to walk to find transportation. And transportation is expensive... sometimes it costs 400 quetzales. A man in these communities earns about 10 quetzales a day. Even if we tell him to save some money every day during the last month of pregnancy, how is he ever going to save enough?"

Elena Hurtado
IEC Advisor, MotherCare/Guatemala

trained in their implementation. These protocols have since been revised and adopted as the National Protocols.[1] Based on these protocols, competency-based training curricula have been developed with assistance from the American College of Nurse Midwives (ACNM). MotherCare is currently training health personnel (physicians and nurses) in the six health areas at all levels (hospital, health center/post) to identify and respond quickly to obstetrical and neonatal complications and to improve their IPC/C skills.

At the community level, TBAs are being trained to improve their technical knowledge so that they can more effectively recognize and refer obstetrical and neonatal complications. In each health area of the project, training of trainers (TOT) workshops have been carried out with health personnel, who serve as trainers for TBAs. Training is based on a TBA training curriculum developed by MotherCare/Guatemala which includes issues such as anemia control, lactational amenorrhea method (LAM), neonatal resuscitation and postpartum family planning. These courses are so popular that, as TBAs learn about them through word of mouth, sometimes twice the number expected attend. Training of all health personnel emphasizes a need to foster good working relationships among the various levels of health care providers.

To complement these competency-based trainings, MotherCare assisted in the development of maternal mortality registries. Originally designed for use in hospitals to help physicians identify problems, these registries have become vital instruments for monitoring and data collection, case management, and ultimately for training. To this end, in each hospital, cases are reviewed every one to two months based on the data collected in these registries. Health personnel discuss and compare actual and ideal case management based on protocols. All health providers are trained to use the registries and to apply them to improve the quality of services provided.

"There is the fear of the hospital. The women get there late and many women die in the hospital. It becomes a place where people die. And also women are very afraid of getting a Cesarean section. So they say, "women who go to the hospital come back with Cesareans." They also feel ashamed. The procedures are so different. They have to take off their clothes. Women never take off their skirts in these communities – even for birth, even for sexual relations. The skirts are not removed."

Elena Hurtado
IEC Advisor, MotherCare/Guatemala

Community Mobilization

Community mobilization is a key factor in the success of the MotherCare/Guatemala project. MotherCare has learned a tremendous amount about the ability of communities to mobilize resources and create solutions to overcome the barriers to maternal health. In Quetzaltenango, one community came together and requested the services of a hospital resident at a Community Maternity (CM). The hospital and the community are now working together to provide an alternative to hospital or home delivery. The community provides housing and support for the resident, and the resident cooperates with TBAs in the community so they will bring in their patients for delivery by a trained attendant. These TBAs are encouraged to remain with their patients throughout delivery.

MotherCare/Guatemala is attempting to build on this innovative effort by establishing one demonstration CM in each of the six health areas. The CMs will provide quality prenatal, delivery, postpartum and gynecological services in the community, respecting Mayan cultural traditions. MotherCare/Guatemala has held workshops with communities to develop strategies for the maternities, supported the formation of maternal mortality committees, provided technical advice for community mobilization and identification of resources, and provided

[1] INCAP/PAHO and Hospital General de Occidente San Juan de Dios (1993). *Obstetric Management Protocols for Regional-Departmental Hospitals; Guidelines for the Management of the Principal Neonatal Emergencies for Regional-Departmental Hospitals; and Management of Obstetric and Neonatal Emergencies in Community Health Centers and Health Posts.* Quetzaltenango Maternal and Neonatal Health Project. INCAP: Guatemala.

training in essential obstetric care and interpersonal communication for community maternity staff. Two community maternities have been established to date, with plans to open four more by the end of the project. One major accomplishment of this strategy is drawing hospital staff together more closely with community members, as it is hospital personnel who staff these CMs.

Training of TBAs through role-playing.

In order to better understand the knowledge, attitudes and practices regarding pregnancy and childbirth among the population, MotherCare/Guatemala conducted formative research through focus group discussions, in-depth interviews and observations. Based on the research findings, MotherCare has designed and validated an IEC strategy through focus groups involving women, men and TBAs from the community. MotherCare has reviewed and is currently disseminating the materials which were developed from this strategy, including brochures describing obstetrical and perinatal danger signals to distribute to TBAs, women and men, and posters describing how to treat clients in a humane way. A radio program ("*Salud para la Vida*") has been recorded to promote the recognition of complications of pregnancy, including anemia, and to urge the prompt referral of women to hospitals when complications appear. The program is recorded in K'iche and Mam (Mayan languages) as well as Spanish, and it addresses both traditional care and biomedical services. Radio stations in each of the six health areas are currently airing the program.

To further enhance community mobilization, MotherCare identified several women's groups in six municipalities, one in each health area. MotherCare began working with them in 1997, offering them a series of seven participatory educational sessions on maternal and neonatal health. Each session is based on a "triple A" approach which entails 3 steps: ***A**utodiagnóstico* (self-diagnosis), **A**nalysis and **A**ction. MotherCare has added a fourth **A** (for ***A**prendizaje*, or "learning" in English) to build on women's assessment and analysis skills. During the first session, MotherCare helps identify actions these women can undertake, such as forming an "emergencies committee" or visiting all pregnant women in order to advise them. Subsequent sessions help women make these actions a reality. The sessions have been extremely popular among women, who report that they frequently have heard about children's health, but had never discussed their own health. Since demand for the sessions has been higher than anticipated, MotherCare is now training facilitators from nongovernmental organizations (NGOs) such as CARE to replicate the session with their own organized women's and men's groups.

Monitoring and Evaluation

MotherCare/Guatemala's monitoring and evaluation plan is designed to monitor inputs and outputs at all levels in the six health areas. Monitoring and evaluation data is being collected in select municipalities in each health area from the delivery registries at the health area hospitals and health centers. These registries

provide pre- and post-survey information capturing data such as case fatality and use. Data will be reviewed during three separate time periods. Outcomes from IEC/C and community mobilization activities are being recorded through registries, observations and individual interviews with women and families. Pre- and post-information on women's knowledge is being gathered through the self-diagnosis conducted through women's groups.

Conclusion

MotherCare has been working in Guatemala since 1990 and has assisted the MSPAS to identify objectives and realistic strategies for improving maternal and infant health. Starting from a single health area, the project has expanded into six health areas and is demonstrating the ability of policymakers, health providers and communities to work together toward mutual goals of safe motherhood.

Research on Anemia—MotherCare/Guatemala

MotherCare was one of several organizations that contributed both technically and financially to the National Micronutrient Survey (1996), which found that 39% of women aged 15-44 in the *altiplano* are anemic. MotherCare has since conducted qualitative research to determine beliefs regarding anemia and barriers to taking iron pills. Two research projects are being conducted: one focuses on health personnel knowledge and practices (including availability of iron pills), and the other project studies pregnant women's behavior and barriers to taking iron supplements (MotherCare/Guatemala, July 1996).

Health Facilities and Personnel

The study on health personnel and facilities showed that iron pills were generally not available. Health services were giving pregnant women a limited amount of prenatal vitamins, but almost no iron pills. Identifying this deficiency was essential because without iron pills, there would have been no intervention. Consequently, efforts were directed to making health areas aware of the need to include an amount in their budgets to purchase iron pills. As a short-term measure, UNICEF was asked to donate the iron pills. To date, UNICEF has donated 3 million iron pills, with another 3 million to be sent in 1998; these pills are available for pregnant women who visit health facilities for prenatal care.

In this study, a self-administered questionnaire was completed by 90 health workers prior to training in anemia and iron supplementation during pregnancy. Health workers most frequently recognized the following symptoms of anemia: sleepiness (58%), fatigue (48%), paleness (48%), listlessness (37%), and headache (37%). In direct observations of health personnel, less than half (48%) asked about patient's symptoms of anemia. Since the study, health personnel have received training on anemia and iron supplementation, and they will receive refresher training on counseling as well.

Behavior of Pregnant Women

Two small-scale iron-supplementation behavior trials were conducted to identify reasons why pregnant women may not take iron supplements. The study focused primarily on women's behavior, and the findings have been used to modify counseling messages for health personnel. Prior to the intervention, few women were given iron pills. In the first trial, 40 pregnant women received 10 iron pills each and were given instructions to take one a day for 10 days. There was some variation among women with respect to taking the pills as advised, but 32 reported taking the pills daily. Women were asked about negative and positive effects of the pills. They identified foul breath, headache, sleepiness, stomach ache, constipation, bad body smell, diarrhea, and fast heartbeat as negative effects. Perceived positive effects of taking iron included increased appetite and energy and a general feeling of improved well-being. In the second trial, 25 pregnant women received 20 iron pills and were told

to take one every day with a vitamin C-rich beverage. Twelve of the women followed instructions to take the pills with a vitamin C drink, and 11 took one pill each day. Survey interviews were conducted with 316 users of prenatal care. These women were presented a vignette of a "pregnant woman feeling nauseous, sleepy, tired, and looking pale." Thirty-eight percent said that the woman was "weak" or had "weak blood" and not quite a third used the term anemia to describe her condition. The illness was considered serious by 90% of the women. Some stated that it diminishes their energy to work, causes loss of appetite and can cause death of the woman during delivery.

Focus group discussions were conducted with: 1) pregnant women (9 groups), most of whom did not attend health services for prenatal care; 2) their spouses (4 groups); and 3) TBAs (4 groups). These pregnant women stated that "weakness" or "weak blood" is a normal condition of pregnancy, and only one of them used the term "anemia." Moreover, among the complaints of pregnancy expressed by these women, several are signs and symptoms of anemia. Women attribute weakness to poor nutrition which worsens during pregnancy since the mother shares whatever she eats with the unborn infant. TBAs are afraid iron pills will make the baby grow too much and complicate delivery; therefore, they often advise the women to take iron supplements only during the postpartum period. Husbands distrust iron pills for their resemblance to contraceptive pills. Also, these men expressed the view of their mothers (the women's mothers-in-law) that "in old times we didn't take any pills during pregnancy and babies were born just fine."

Training and IEC Strategy

Based on the findings of this qualitative research, MotherCare designed an IEC strategy for anemia, which it is currently implementing. In addition to training health personnel on anemia control and counseling, MotherCare has developed an informational leaflet to be given to women along with the iron pills. The leaflet holds the packet of iron pills, provides information on prevention, control, and side effects, and lists a variety of health organizations that endorse the use of iron supplementation. To reach the broader community, segments of the radio program *"Salud para la Vida"* will focus on recognition and control of anemia. MotherCare is also training TBAs to distribute iron pills and is developing a system to track distribution by TBAs and compliance by pregnant women.

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MotherCare/Indonesia

Introduction

The maternal mortality ratio (MMR) in Indonesia is estimated at 420 deaths per 100,000 live births (1992) which is 3 to 6 times that of other ASEAN countries (Ministry of Health, 1996). To address this high level of death, the Indonesian Government is committed to the goal of reducing the MMR to 225 per 100,000 live births by the year 2000. Since data showed 70% of births occurred at home, and 60% were delivered by traditional birth attendants (TBAs), the major strategy of the Ministry of Health (MOH) has been to increase the number of births attended by clinically trained health care providers whether at a facility or in the home (CBS et al., 1995). To bring health services closer to the community, the MOH is placing midwives in every village, especially those villages that are more remote. In 1993, the MOH began placing the first of 54,000 village midwives who had been trained in a "crash" program. The strategy was to train as many service providers as possible, as quickly as possible. Experience has shown that the village midwives, due to their limited experience, need additional support in the form of further training and continuing education. In addition, support is needed to improve both the quality of services at other referral levels, and the willingness and ability of the community to access these services. While the latest estimates show an improvement in the MMR, 390 per 100,000 live births (CBS et al., 1995), reaching the MOH goal of 225 in a little more than two years remains a major challenge.

MotherCare has been working with the Indonesian Ministry of Health (MOH) since 1994 to support and enhance the ongoing Government of Indonesia's Safe Motherhood Program. The province of South Kalimantan was selected by the MOH to develop an innovative and integrated approach to Safe Motherhood in three target districts (Banjar, Barito Kuala and Hulu Sungai Selatan). Tables 1 and 2 provide information on South Kalimantan and compare mortality levels and health coverage in the MotherCare districts to provincial and national data. This approach is expected to be used as a model for other provinces in Indonesia, especially among the outer islands.

MotherCare assistance includes: (1) **improved quality of services** through in-service training of midwives (*bidan*), based in health centers

Table 1

Profile of South Kalimantan (1995-97)

Population: 2,783,505 Districts: 10 Subdistricts: 109 Provincial Capital: Banjarmasin

Districts Receiving MotherCare Support	Population	Pregnant Women (estimated)	Hospitals	ObGyns (1997)	Health Centers with beds	Midwives *(bidan)* (1997)	Village Midwives *(bidan di desa)* (1997)
Banjar *(40 km fr. Banjarmasin)*	507,478	13,062	2	2	2	119	208
Barito Kuala *(50 km fr. Banjarmasin)*	256,759	6,609	1	—	5	52	185
Hulu Sungai Selatan *(135 km fr. Banjarmasin)*	214,470	5,620	1	1	3	57	143

Source: Ministry of Health and South Kalimantan District Health Office, personal communication, 1997.

Table 2

Key Indicators for MotherCare Districts Compared to Provincial and National Data (1993-96)			
	MotherCare Districts[1]	**South Kalimantan**	**Indonesia**
Maternal Mortality Ratio (per 100,000)	Not available	543[2]	390[3]
Perinatal Mortality Ratio (per 1,000)	21.5	Not available	Not available
Deliveries by trained attendant (%)*	35.4	47.6[2]	55[4]
Antenatal Care (coverage) (%)	65.7	81.7[5]	87[3]
Antenatal Care (four visits) (%)	36.7	51.6[5]	63[3]
Postpartum Coverage (%)**	36.2**	60.2[5]	Not available

[1] All data from MotherCare/Indonesia, 1996.

[2] CBS, 1997.

[3] CBS et al., 1995.

[4] Data from 1996. Ministry of Health, personal communication, 1997.

[5] Data from January-December 1996. Ministry of Health, South Kalimantan Province,personal communication, 1997.

* The DHS data is not comparable to MOH or MotherCare data because DHS records births as attended by the least trained provider present and the MOH/MotherCare record by the highest level provider present.

** The MotherCare Community-Based Survey counted at least one postpartum visit by a village midwife while the South Kalimantan MOH data is based on two postpartum visits.

and hospitals, and village-based midwives (*bidan di desa*), supported by a peer review and continuing education system through the provincial chapter of the national midwife association (IBI); (2) **improved referral**; (3) **behavioral change** in the community and of providers through an integrated information, education and communications (IEC) strategy; and (4) the **formulation of policies** that will support these initiatives. As part of the effort to improve service provision, MotherCare is also working to strengthen the institutional capacity of the national midwife association at the central level to provide greater support to its midwife members.

Improving Quality of Care

In addition to training and continuing education for *bidan/bidan di desa*, MotherCare's strategy to improve quality of care in Indonesia includes visiting women at home during the postpartum period, conducting maternal and perinatal audits, and improving maternal and child health (MCH) management and referral systems.

To build on the MOH strategy of improving care at the community level, MotherCare is working with the MOH to ensure the presence of a "competent" village midwife at every delivery (exclusive of whether the actual delivery is by the village midwife or TBA). This strategy will increase the opportunity for recognition of complications and management in the early stages, as well as timely referrals.

To ensure midwives and village midwives improve and maintain their level of knowledge and skills, MotherCare is working with the MOH and IBI to develop a Training/Continuing Education System for South Kalimantan. With the support of the American College of Nurse Midwives (ACNM), **Life Saving Skills (LSS)** training has been adapted to meet the local needs in South Kalimantan. LSS training teaches midwives skills to recognize and manage obstetrical complications. Midwives from hospitals and community health centers (*puskesmas*) are given the full LSS training at one of two sites. Village midwives, because they do not have the clinical volume to maintain all the LSS skills, are trained in some aspects of life saving

skills (including partograph, infection prevention, infant resuscitation, and postpartum hemorrhage) as well as normal antenatal, labor and delivery, and postpartum care (see Table 3). During this two-week training, the village midwives, who are often young and have limited experience, are also taught counseling skills and techniques to help them integrate into the community. Training for these non-clinical skills is based on the ***Healthy Mother, Healthy Newborn*** manual, recently developed by MotherCare and ACNM for community level providers (see Table 3). Village midwives learn how to use a variety of IEC materials developed through MotherCare, to assist with: 1) counseling pregnant and postpartum women; 2) informing community members about the village midwife's services; and 3) recognizing, being prepared, and acting when there is a maternal complication. All training is competency-based, using participatory learning, with an emphasis on practical experience, including observing and assisting with as many deliveries as needed for each participant to achieve competence.

Table 3

Comparison of Midwife and Village Midwife Training Content

	Midwives ***(bidan)***	**Village Midwives** ***(bidan di desa)***
LSS Training	Episiotomy / Repair of Lacerations / Hydration and Rehydration / Prevention and Management of Sepsis	
	Prevention and Treatment of Hemorrhage / Infant Resuscitation	
LSS and Healthy Mother, Healthy Newborn	Infection Prevention / Antenatal Risk Assessment and Care / Labor and Delivery Management (Including Partograph)	
Healthy Mother, Healthy Newborn		Postpartum Care *(by 6 hours, 3 days, 2 weeks, 6 weeks)* Breastfeeding Counseling Family Planning Counseling IEC Community Integration *Bidan di Desa* Register IPCC

Qualitative research conducted in the three districts showed that one of the constraints to the village midwife's integration into the community is a lack of good communication skills. With the assistance of MotherCare and PATH, the MOH has conducted **Interpersonal Counseling and Communications (IPC/C)** training for all the village midwives in the three districts to provide further grounding in these critical skills. The midwives, who are the continuing educators for IBI, also serve as the IPC/C trainers, further enhancing their ability to serve as a long-term resource to the *bidan di desa*. The impact of this training on the behavior of the *bidan di desa* will be monitored in a subsample of *bidan di desa* during the MotherCare project period.

Research has shown that a high proportion of mothers who die related to pregnancy in developing countries, die in the postpartum period, especially during the first 24 hours (Fortney et al., 1996). The presence of the village midwife at delivery and within the first six hours (at the first postpartum visit) can help significantly increase recognition of postpartum complications and ensure their timely referral or management. Thus, the postpartum component of the village midwife training involves her in a **Postpartum Home Visit Program** in which 4 visits are required during the 6 week postpartum period (by 6 hours, 3 days, 2 weeks, and 6 weeks). During these visits the village midwife provides care for the mother and the newborn and encourages healthy behaviors such as good hygiene, improved nutrition (including 40 iron tablets and vitamin A) and exclusive breastfeeding. In addition, this program is intended to prevent postpartum maternal deaths.

The in-service training for midwives and village midwives has been integrated with a system of monitoring and support organized and imple-

Box 1—Maternal and Perinatal Audit (MPA)

During the past year, MotherCare has worked closely with the provincial- and district-level MOH in South Kalimantan to implement the maternal and perinatal audit. Through the MPA, all maternal and perinatal mortality cases are reported and village midwives conduct a "verbal autopsy," interviewing the community to determine the causes of death, both medical and non-medical (see Table 4). These clinical, managerial, and socio-cultural constraints are then reviewed at the MPA meeting with health center, district-level MOH, district hospital staff, and TBAs if they are involved in a case. The national organization for wives of civil servants, which is very active in community development, has also been asked to attend the district level MPA meetings to help spread lessons learned and tackle community level problems. With MotherCare assistance, the MPA is now being conducted regularly at the regional (several health centers) and district levels in all three districts supported by MotherCare. As of July 1997, 24 MPA meetings have been held.

Through the MPA, the hospital is brought into closer contact with the community and health care providers can begin to see the constraints at the community level. However, they also recognize that maternal deaths are not always due to obstacles in the community but can be related to clinical management, lack of supplies, etc. In turn, efforts are being made to involve community members so they can see that maternal deaths are not all related to the health system, but also to problems in the community. There are also plans to have intersectoral representation to address problems outside the health system.

mented by IBI. Through regular **Peer Review**, individual village midwives receive supervision and guidance from more senior midwives trained in the process of peer review. **Continuing Education** materials are developed from the information collected during individual peer review visits on knowledge and skills requiring further reinforcement and are presented to all midwives at IBI district-level monthly meetings to help them improve their skills.

The combined training and continuing education system represents a partnership between the MOH and IBI to maximize the use of local resources in supporting the village midwife and to strengthen the quality of services provided at the community level. MOH/IBI/MotherCare began the establishment of the system in October 1995, and as of September 1997, 102 midwives and 90 village midwives had been trained, with peer review and continuing education being put in place as midwives complete their training.

As part of this process, the training system has also been integrated with other aspects of the MOH Safe Motherhood Program, including MCH Program Management (see *Monitoring Systems and Program Evaluation)* and the Maternal and Perinatal Audit (See Box 1). These linkages help to build and strengthen maternal and neonatal services and promote

Table 4

Causes of Maternal Death *(reported in percentages)*

Cause	South Kalimantan*	Indonesia**	Developing Countries***
Hemorrhage	38.9	40-60	50.2
Infection	5.6	20-30	29.9
Preeclampsia/Eclampsia	22.2	20-30	12.9
Other	16.7	—	0
Not recorded	11.1	—	0

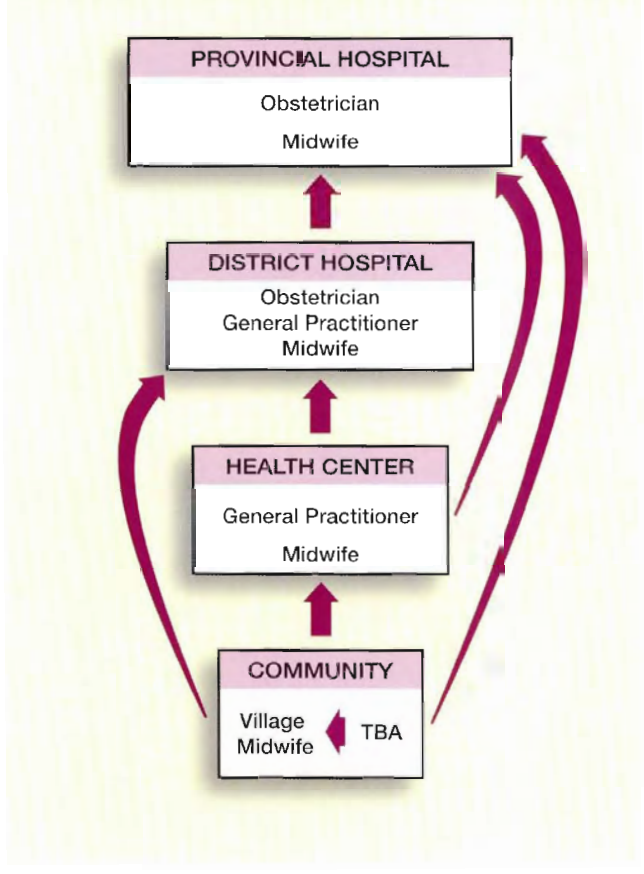
Sources: *MotherCare, based on initial MPA statistics from three districts of South Kalimantan, October 1995-November 1996. **Ministry of Health, 1996. ***Fortney, JA et al., 1996.

information transfer among the *bidan* LSS trainers, IBI peer reviewers and continuing educators, district-level health system, health centers and the community.

Improved Referral

In addition to ensuring that each provider has the knowledge and skills she needs to appropriately treat her clients, the LSS training also reinforces the ability of village midwives to make appropriate decisions about referral. Furthermore, TBAs (*dukun*) still attend 45% of deliveries (Ministry of Health, 1996)[1] and qualitative research in South Kalimantan showed they have considerable influence with families when making a decision to seek further care. Consequently, during the LSS training, village midwives are trained on how to work with TBAs to improve their knowledge on recognizing signs of complications, and they are given specific guidelines to pass on to the TBA about when to refer women to the community health center or a hospital. A booklet designed through MotherCare — **"When a Dukun Should Refer"** — provides the most critical information on bleeding, prolonged labor, malposition, eclampsia and anemia; it is given to the village midwives as a tool to communicate this information to the TBA.

HEALTH SYSTEM STRUCTURE AND REFERRAL PATTERNS



In order to ensure consistency in the clinical management of maternal morbidity cases at all referral points, **mini LSS workshops** have also been conducted for doctors and midwives at hospitals and health centers, where referrals from the community (including village midwives) might be sent. These workshops provide an orientation on use of the partograph (a labor management tool), infection prevention, hemorrhage and infant resuscitation.

Because district hospitals are not usually staffed with an OB/Gyn, General Practitioners (GPs) are being trained to manage obstetric emergencies. The training entails a three-month internship at the provincial hospital to manage life-threatening obstetrical complications that are outside the authority of the midwife, such as cesarean section, laporotomy, and vacuum extraction. The anesthesiology paramedic from the district hospital also trains with the GP for one month if there is no anesthesiologist at the hospital. MotherCare has assisted with the curriculum, advising an emphasis on diagnosis, a system of mentoring and the development of standard operating procedures. These trained GPs will augment the availability of obstetric services at the district hospital.

Behavioral Change

Since the utilization of services in South Kalimantan is quite low, MotherCare has worked with the MOH to develop a community-oriented IEC strategy that will complement improvements in the quality of care by increasing the utilization of services by the community. This strategy is designed to increase the community's awareness about the importance of caring for the health of pregnant and post-

[1] TBAs attend 44% of deliveries in the three MotherCare districts in South Kalimantan (MotherCare, 1996).

Village midwife at her home cum birthing house, South Kalimantan, Indonesia.

partum women, recognition of maternal complications, and willingness to seek care when such complications arise. Messages were developed based on the findings of qualitative research (focus groups, in-depth interviews, and observations). Printed materials — posters, flyers, counseling cards — have been developed for village midwives and health centers to use with both the community and TBAs. A radio campaign to strengthen the image of the village midwife and to provide safe motherhood messages is also scheduled to be launched in November 1997.

To increase receptivity of the community to these messages, MotherCare has involved local leaders and organizations in the IEC campaign. One flyer includes a photograph of a prominent local religious leader who endorses the messages to husbands regarding the importance of good health for pregnant women and the need to seek care in case of a complication. This flyer will be distributed through both the health system during antenatal visits and the Ministry of Religion at the district level upon marriage registration. The wife of the provincial governor has agreed to have her photograph on a booklet to encourage families to be prepared (both logistically and financially) for emergencies during pregnancy and childbirth.

The national organization for the wives of civil servants is also working with the provincial MOH and MotherCare to promote the Postpartum Home Visit Program and the role of the village midwife to provide maternal and neonatal services in the community.

Monitoring Systems and Program Evaluation

MotherCare is supporting the MOH's effort to improve management of and coverage by the MCH program through intensive supervision at each level, starting from the province down to the *bidan di desa.* The actual number of pregnant and high risk women in the community, the target population for Safe Motherhood, is being recorded more accurately through intermittent sweeping by the village midwife. Increased supervision in the form of periodic visits by the district team to the health center, and the health center to the village midwife, has also resulted in improved routine reporting and recording of information, which is expected to lead to improved antenatal coverage (first visit in first trimester and 90 iron pills given antenatally) and increased presence of village midwives at deliveries. Information from each level of the health sector can also be used to better understand issues that need to be addressed in that district. Management problems, such as *bidan di desa* needs for equipment and supplies (also identified through the MPA), are then addressed at MCH Management meetings at the district and provincial levels.

MotherCare is monitoring and evaluating the implementation and effect of the interventions being undertaken with the MOH and IBI. Part of this monitoring includes the modification of **hospital Labor and Delivery Registers.** MotherCare has worked with all the hospitals

(and one health center with a significant number of deliveries) to revise the registers to include information on referral, complications and case management. The hospitals began using the registers in September 1996 with continuing monitoring and assistance from MotherCare. As data are collected, MotherCare will conduct preliminary analysis and return this information to the facilities for their use in improving quality of care.

MotherCare has also instituted ***Bidan di Desa* Registers** which village midwives who have received the LSS training complete in order to document services provided to each pregnant woman in her community. It records antenatal services, details about delivery including provider(s) attending, the four postpartum visits, and any complications or referrals at any stage for each woman delivering in her village, regardless of whether the village midwife attends the delivery. With this documentation, coverage and case management of pregnant, parturient and postpartum women and newborns can be monitored more closely.

While these registers will serve as the main data collection instruments to monitor and evaluate the overall program, special tools have also been developed to ensure that the intervention is well implemented. Peer review checklists help to determine whether clinical and counseling skills are retained following training and needed supplies are adequate. Exit interviews with clients monitor whether radio or IEC messages are heard by the target audience and a pre/post community-based survey evaluates whether community level knowledge about birthing practices are improved.

Changes will be measured through, among other indicators, increases in the number of births attended by a trained provider, increased met need by hospitals in the region, increased iron consumption by pregnant and postpartum women, and increased coverage of women during the postpartum period. Changes in provider practices, particularly those of village midwives, will also be evaluated particularly in the use of the partograph (a labor management tool), infant resuscitation, infection prevention and management of postpartum hemorrhage.

Policy Formulation

Ongoing program interventions provide information concerning the maternal health situation, some of which suggests the need for policy change and formulation. For example, in South Kalimantan, based on discussion of an MPA case, magnesium sulfate (financed with provincial funds) is now being given to all village midwives to treat eclampsia. Following discussions of a recent death of a woman due to hemorrhage, an effort is being made to ensure every *bidan di desa* has the standard intravenous infusion equipment needed to treat shock from hemorrhage.

The approach and guidelines introduced in South Kalimantan to ensure quality training are influencing the national MOH approach to in-service training for midwives. The MOH is undertaking new midwife training programs that include important preparatory steps, such as setting up training centers and conducting training of trainers. Moreover, they are using training methodologies that encourage quality, including competency-based training and participatory teaching. Though still in the early stages, it is encouraging that policymakers accept quality training approaches.

Also to ensure improved quality of services, MotherCare is working with the Ministry of Health to develop national protocols for obstetrical complications for providers at the health center level, since there were no standard protocols available in Indonesia. Input from the program may also lead to changes in pre-service training as a means of improving care prior to the midwife beginning to practice. MotherCare is providing assistance to revise the national guidelines for the MPA and to modify the forms to ensure that information collected is accurate, complete and used in a constructive manner.

MotherCare's work to build the institutional capacity of IBI at the national level is in part aimed at empowering IBI to participate in the improved quality and professionalization of midwifery in Indonesia. To meet the challenges of a rapidly expanded membership and increasing prominence among donors working in Safe Motherhood, MotherCare is helping IBI

to improve management at the national level and is also working with the Board of Directors on strategic planning. Through this organizational development, IBI will be increasingly empowered to support its membership with programs such as the peer review/continuing education/fundraising in South Kalimantan and to work in partnership with the government in the Safe Motherhood program.

Conclusion

As MotherCare moves beyond the design and implementation stages into monitoring and refinement of the program, increasing consideration is being given to the sustainability of such an intervention. MotherCare is planning a cost-effectiveness study to determine sustainability in terms of resources for such an integrated package of interventions. In addition, while the success of the competency-based approach may be seen in improved quality of services and increased attendance of deliveries by midwives, the Indonesian MOH continues to push for a rapid solution to decrease maternal mortality. MotherCare is working with the MOH to find a solution to provide competency-based training to as many providers as possible within the ambitious targets of the government's Safe Motherhood Program.

Integrating Anemia into Safe Motherhood —MotherCare/Indonesia

Though the prevention and management of maternal anemia is an integral part of the enhanced antenatal and postpartum services supported by MotherCare, special attention is also being given to this important contributor to maternal morbidity and mortality. MotherCare is working with the provincial MOH to spearhead a special component of the IEC strategy focusing on maternal anemia — estimated at 55.6% in South Kalimantan — to increase knowledge about anemia and demand/compliance for iron pills. All village midwives in the three districts have received training about anemia and iron supplementation and have been provided with counseling materials to help increase awareness about anemia among pregnant and postpartum women and encourage them to take iron pills. Radio spots developed for broadcast in South Kalimantan reinforce this message by explaining the benefits of consuming iron pills. It is expected that these efforts will result in an increased demand for iron pills among both pregnant and postpartum women.

To complement the increased demand, MotherCare is also working closely with the MOH on an effort to increase the supply of iron folate tablets through the private sector. The main pharmaceutical suppliers are cooperating with this program to ensure availability of iron pills at every level. Small shops and drug stores at the community level are receiving a package of materials through the village midwives including a flyer explaining the need for and possible side effects of consuming iron pills so they can educate their customers; a poster promoting iron pills with a picture of the local religious leader who supports this program; and a banner that they can use for advertising their iron pill supplies.

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Training Midwives to Improve Postabortion Care in Ghana

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Late one May evening, a midwife named Constance was awakened at her maternity home by a woman in need of medical care. Akoshua had been hemorrhaging since the early morning, and her husband had brought her there hoping that Constance could slow the vaginal bleeding enough so that he could transport her safely to a larger health center, even more distant from their home.

Constance, however, was able to provide more than first aid. She diagnosed Akoshua with incomplete abortion, talked to her about her health status, evacuated her uterus using manual vacuum aspiration (MVA), and counseled her on different contraceptive methods. One hour after arriving at Constance's maternity home, Akoshua was resting comfortably. Within the next hour, she and her husband were on their way home. Akoshua would return to see Constance for a follow-up exam a few weeks later.

Akoshua was very fortunate that evening. What her husband did not know was that the larger health center would have referred her to the regional hospital, even further from their home. Given the gravity of her condition, it is uncertain that Akoshua would have survived the trip.

Constance was able to provide this life-saving care because she had recently been trained in comprehensive postabortion care as part of the Ghana MotherCare operations research project. Akoshua was the first patient with incomplete abortion that Constance had managed by herself in her private maternity home in Eastern Region, Ghana.

This article highlights some of the major findings from the MotherCare operations research project, "Training Non-Physician Providers to Improve Postabortion Care," conducted by the Ministry of Health (MOH) of Ghana, the Ghana Registered Midwives Association (GRMA), and Ipas. The project aims to evaluate the safety, feasibility, and acceptability of training midwives to provide comprehensive care to women experiencing abortion complications.

Background

In Ghana, as in many countries, unsafe abortion significantly contributes to high rates of maternal mortality and morbidity.[1] Hospital-based studies report that about 22% of all maternal deaths in Ghana are the result of unsafe abortion (Deganus-Amorin, 1993). The true figure is certainly higher as many women never reach urban-based health institutions when they experience abortion complications.

In Ghana, hospital-based physicians traditionally have been the only health professionals authorized to manage abortion complications. Yet more than 90% of these doctors work in the major urban areas of Ghana and are inaccessible to most women, most of whom reside in rural areas and have limited access to hospital facilities. In contrast, midwives are located throughout the country, often working in

[1] Unsafe abortion refers to "the termination of pregnancy performed or treated by untrained or unskilled persons." It also refers to the unsafe management of complications accompanying spontaneous abortion. World Health Organization (1995). *Complications of abortion: Technical and Managerial Guidelines for Prevention and Treatment.* World Health Organization, Geneva.

health centers and private maternity homes in closer proximity to where women live. Until recently, however, Ghanaian midwives were not authorized or trained to provide this life-saving care to women who came to them seeking help.

Postabortion care (PAC) is a strategy to reduce mortality and morbidity from unsafe abortion. This strategy includes emergency treatment for abortion complications, postabortion contraceptive services, and linkages with other reproductive health services. It was endorsed by 179 participating governments at the 1994 International Conference on Population and Development (ICPD). Moreover, organizations such as the International Confederation of Midwives (ICM), the International Federation of Gynecology and Obstetrics (FIGO), and the World Health Organization (WHO) also recognize that midwives must be trained and authorized to manage abortion-related complications if the goals of the Safe Motherhood Initiative are to be achieved.[2]

The MOH of Ghana has taken groundbreaking steps by integrating PAC into its National Safe Motherhood Programme and by identifying midwives as appropriate providers of PAC services in its 1996 National Reproductive Health Service Policy and Standards. In addition, the MOH has worked with the GRMA to improve contraceptive services delivered by midwives in the private and public sectors and with Ipas to train physicians in PAC. This operations research project was initiated in 1995 as a collaborative effort to extend PAC training to midwives. All activities have taken place within the context of a supportive policy aimed at improving women's reproductive health in Ghana.

Training Midwives in Postabortion Care: The Ghana MotherCare Project

Improving women's access to emergency care is a central aim of this MotherCare project which, in various ways, has been met by training midwives in health centers and maternity homes. Many women note their familiarity with the midwife as a main reason for going to her for help. Moreover, the cost of services provided by midwives is significantly less than hospital-based care, particularly in those hospitals which continue to treat women with sharp curettage. Most women are able to reach the midwife's facility in less time than it would take to travel to the nearest hospital, and women receive services and are able to return home more quickly when they seek care with a midwife. Facilitating women's access to care —financially, geographically, and socio-culturally — may enable midwives to treat abortion complications before long-term illness or death ensues.

> *"Some of the patients come from far away so if the midwife in her community can do it [provide PAC], it saves lives, money, and prevents complications."*
>
> ***—a district hospital physician***

The Ghana MotherCare project began with a baseline assessment of existing postabortion care services, followed by a series of week-long trainings in which midwives working in public health centers and private maternity homes, and physicians and midwives working in district hospitals were trained together in PAC. District hospitals included in this project are among the most common referral sites for health centers and maternity homes in the study areas. Monitoring/support visits are being conducted with all of the trained midwives and refresher trainings are held according to the needs identified during the visits. Post-training assessment of services was conducted and completed in mid-1997.

Midwives included in the project have been practicing for an average of 20 years. More than half have received prior training in family plan-

[2] WHO. Report of ICM/WHO/UNICEF Pre-Congress Workshop on Women's Health and the Midwife: A Global Perspective. WHO/MCH/87.5, WHO, Geneva, 1987; WHO. Midwifery Education: Action for Safer Motherhood. Report of a Collaborative Pre-Congress Workshop. Kobe, Japan, 5-6 October 1990, WHO/MCH/91.3, World Health Organization, Geneva, 1991; WHO. *Care of Mother and Baby at the Health Centre: A Practical Guide.* WHO/FHE/MSM/94.2, WHO, Geneva, 1994; ICM. "Care of Women Post Abortion." Resolution adopted at the International Confederation of Midwives' Council, Oslo, Norway, May 1996.

ning counseling and methods, as well as in Life-Saving Skills. Therefore, many had previous experience in integrating reproductive health services into essential obstetric care.

Dr. Taylor with a midwife during a monitoring/support visit, Ghana.

All midwives who have been trained in PAC through this project have treated or referred women suffering from abortion complications, including incomplete abortion. In the past, midwives could only refer a woman to the nearest hospital, but today they are equipped and trained to provide treatment. Midwives report that this new skill has made them feel more confident and competent in their profession and has increased community members' respect for their abilities.

Eighty percent of the trained midwives have already had the opportunity to use MVA for women with an incomplete abortion. In several cases they have asked for assistance from another provider during their first procedures, particularly from another midwife trained in the program. Two midwives who were trained through the project conducted their first procedure together to lend one another support. Another accompanied her client to the district hospital and was able to participate in the woman's treatment, under supervision of the attending physician.

> *"The first case felt difficult because it was new, but then it was successful so the others were easy."*
>
> ***—Margaret, a private midwife***

In addition to providing MVA services to women experiencing incomplete abortions, midwives working in health centers and maternity homes are equipping women with essential information and services critical to their reproductive health. Prior to this project, women who received emergency uterine evacuation in district hospitals often left the facility without any information about the procedure they underwent, complications they might experience after leaving the hospital, or their return to fertility. Few were offered information about contraceptives, and almost none actually left the hospital with a method (Ghanaian Ministry of Health et al., January 1997). In contrast, midwives are informing their patients/clients about the MVA procedure, possible post-procedural complications, and their rapid return to fertility after an abortion, be it induced or spontaneous. Almost all of the trained midwives are offering women general counseling about different methods, and virtually all who had prior family planning training are providing women with a choice of contraceptive methods. Linking family planning services to emergency treatment is an important step toward enabling women to prevent future unwanted pregnancies.

Immediately after their training, midwives took it upon themselves to engage in community education. Furthermore, as part of the project, MOH District Health Education Officers have conducted community education activities. Both midwives and Health Education Officers have spoken to women's groups in churches, markets, and professional organizations about

the dangers of unsafe abortion and the fact that community midwives now have the knowledge and skills to offer postabortion care.

This project has revealed overall support for equipping midwives with the skills necessary to offer safe and comprehensive PAC services to women with abortion complications. Policymakers, midwife supervisors, physicians, community leaders, women already experiencing abortion complications, and midwives themselves generally agree that by training midwives at the primary level, services will become more accessible to women — thereby saving money, time, and, most importantly, lives. Many expressed concern, however, that midwives must use their new skill appropriately, recognizing the legal and clinical limits of MVA use. Thus, ongoing monitoring and supervision of clinical practice should be two indispensable components of any PAC training program to ensure that quality services are delivered to women.

Health care professionals and policymakers in Ghana have taken groundbreaking steps in their effort to improve the reproductive health of Ghanaian women. Training midwives in PAC is one important strategy being implemented, ensuring that women suffering the effects of unsafe abortion are able to have easier access to life-saving care as well as contraceptive services which will help break the cycle of unwanted pregnancies. This important action is one of many necessary to achieve the goals first outlined a decade ago in the Safe Motherhood Initiative.

General Recommendations from The Project

- Identify postabortion care as an important component of comprehensive reproductive health services and incorporate the decentralization of postabortion care to midwives and other non-physician providers into national policies and training programs;
- Use operations research as a strategy to incorporate the perspectives of policymakers, physicians, midwives, and women into new policies, protocols, and training programs;
- Train midwives working at the primary level and physicians working in district hospitals together to initiate and strengthen referral mechanisms between these two levels of care;
- Devise ways for midwives at the primary level to gain supervised clinical practice; and
- Ensure that monitoring/support visits take place with all trained providers and provide refresher trainings as necessary.

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STD Control for Maternal and Infant Health, Rakai, Uganda: A Progress Report

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Introduction

Genital tract infections (GTIs) and sexually transmitted diseases (STDs) are major public health problems, particularly for pregnant women and their offspring. The GTIs include classical STDs such as gonorrhea, chlamydia or trichomoniasis, and there is growing evidence suggesting the importance of disturbed vaginal flora, particularly bacterial vaginosis (BV) due to depletion of the normal vaginal *Lactobacilli*. Other STDs include bacterial infections such as syphilis, as well as viral conditions such as HIV, herpes (HSV-2) and human papilloma virus (HPV).

The consequences of these infections are serious and varied. In mothers, these infections can lead to complications during pregnancy or delivery including spontaneous abortion or stillbirths and postpartum upper GTIs. In infants, these infections can cause low birth weight, prematurity, congenital infections such as ophthalmia neonatorum or syphilis, and they can increase the risks of infant death or long-term morbidity. In addition, among women with HIV infections, the risks of transmission of HIV to the child may be increased as a consequence of placental membrane inflammation resulting from GTIs. It has been suggested that the burden of childhood mortality and morbidity due to these infections during pregnancy may be equal to the burden of vaccine-preventable diseases.

The recognition and control of GTIs and STDs during pregnancy is difficult for various reasons. For instance, many women do not receive timely or adequate antenatal care, and the diagnosis of these conditions is complex and requires sophisticated laboratory testing which is often unavailable. In the past, treatment was complicated by the need for multidose, multidrug regimens which were difficult to administer and presented problems of poor compliance. In addition, even if women were diagnosed and successfully treated, it was often difficult to trace and treat their partner or partners, so women remained at a high risk of reinfection. Thus, limits of service availability and utilization, limited diagnostic tests, lack of appropriate drug therapies and an inability to treat sexual partners made the control of infection during pregnancy a difficult public health problem in both developed and developing countries. In developing countries, the problems are further exacerbated by the poor access to care as a consequence of severe resource constraints.

In response to these barriers, the Rakai STD Control project has devised a radical new strategy for STD and GTI control. This strategy employs

Study rounds by interviewers, Rakai, Uganda.

newly available, oral, single dose, directly observed treatments, which are delivered in the home to all consenting subjects (mass treatment). To test this innovative strategy, MotherCare, along with National Institutes of Health (NIH), World Bank, and Rockefeller Foundation, is supporting a randomized community-based trial in a rural African setting in which treatment is given to all consenting men and women and their sexual partners. The study assesses the effects of STD control, via mass treatment, for prevention of HIV transmission and acquisition and includes a supplementary study which focuses specifically on how this strategy works for pregnant women. In addition to testing the intervention strategy, the trial offered the potential for assessment of the burden of STDs and GTIs on maternal and infant health. This article describes the basic design of the Rakai STD Control Study and presents preliminary findings relevant to maternal and infant health.

The Rakai STD Control for AIDS Prevention Study and the Maternal-Infant Supplementary Study (MISS)

The Rakai STD Control Study, initiated in August of 1995 and continuing through December of 1998, is being conducted in 56 communities located in rural Rakai, southwestern Uganda. These 56 communities have been aggregated into 10 clusters which have been randomly allocated to 5 intervention clusters (receiving mass STD treatment) and 5 control clusters (receiving mass treatment for helminth infections and vitamin supplements). The study rounds are conducted every nine to ten months.

The mass treatment strategy implies that all consenting female and male residents aged 15-59 years are given the treatment or control regimens, irrespective of whether they have clinical symptoms of disease. This strategy should ensure treatment of all infected individuals — regardless of whether they have symptomatic or asymptomatic illness — and maximize coverage of their sexual partners so that risks of reinfection can be reduced.

During the main STD Control Study rounds, women are visited in the home, interviewed, and asked to provide samples for STD/GTI testing. These samples consist of: 1) venous blood for syphilis, HIV, chancroid and HSV-2 serology; and 2) urine for ligase chain reaction (LCR) detection of gonorrhea and chlamydia, and for HIV testing. Women are also asked to provide self-collected vaginal swabs for detection of trichomonas infections, BV and HPV. Because the treatment regimens are modified during pregnancy, all women of reproductive age are carefully screened by interview, examination, and urinary hCG testing to detect a current pregnancy. If a woman is found to be pregnant, she is treated appropriately and then referred to a midwife who enrolls her into the Maternal-Infant Supplementary Study (MISS) study, which is designed to ascertain the effects of treatment on maternal and infant health.

In the intervention clusters, pregnant women are treated with azithromycin, cefixime and metronidazole, using single, directly observed oral medications, administered over a period of two days. These drugs are effective against gonorrhea, chlamydia, chancroid, trichomonas and BV. In addition, pregnant women with positive syphilis serology are treated with intramuscular benzathine penicillin injections provided in the home. In the control communities, pregnant women receive iron and folate supplements, and if they have serologic evidence of syphilis or symptoms of STDs, they are referred to project clinics or to government clinics for treatment.[1] Since the effects of syphilis on pregnancy are serious and well known, the project has, for ethical reasons, endeavored to treat all cases of syphilis in pregnant control mothers.

As part of the MISS study, the midwives take an obstetric history and provide routine antenatal care. Arrangements are made with the mother to inform the project staff of the completion of her pregnancy, irrespective of whether or not the outcome is a live birth. An informant, termed a "pregnancy scout," is nominated by the mother and asked to contact the study midwife as soon as possible after delivery. The pregnancy scout is often the husband, a village health worker or traditional birth attendant, and s/he is compensated for the costs and time of travel. In addition, mothers are given a sealed plastic bucket containing

[1] The project stocks the government clinics to insure the availability of penicillin to control mothers.

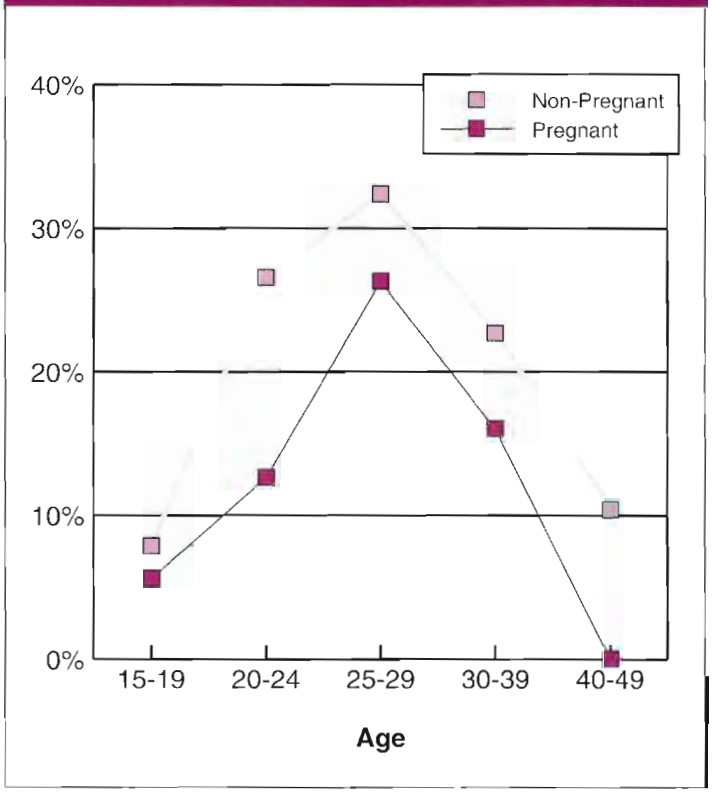
10% formalin and are asked to retain their placentas in the container after delivery. The placentas are examined for histopathologic evidence of placental membrane inflammation at Mulago Hospital, Kampala.

After delivery, all consenting postpartum mothers and their newborn infants are visited by study midwives in their homes (more than 75% are seen within one week of delivery). Mothers are examined for postpartum upper genital tract infections and asked to provide samples for GTI and STD testing. The infants are examined to determine weight, head and chest circumference, gestational maturity (using a modified Ballard score), and for evidence of congenital infections. In addition, swabs are taken from the babies' eyes for LCR detection of gonorrheal or chlamydial ophthalmia, and a heel stick filter paper blood sample is taken for syphilis serology and for HIV testing (using polymerase chain reaction (PCR)). All babies in intervention and control arms routinely receive prophylactic ocular tetracycline ointment, and any suspected case of congenital syphilis is treated with penicillin according to Centers for Disease Control and Prevention (CDC) guidelines. Infants of mothers with HIV or syphilis are followed up at four to six weeks postpartum for repeat blood testing, and all infants are followed via the main study to ascertain their longer-term health and survival.

Enrollment, Compliance and Preliminary Results

There has been a striking level of cooperation by the population with 3,709 pregnant women (over 90% of eligible subjects) enrolled in the study as of September 1, 1997. Thus far, the project has followed up 2,753 mothers and their infants postpartum; this number constitutes approximately 90% of eligible women with completed pregnancies. Estimated prevalence of STDs and GTIs in a representative sample of women from this rural population is high; preliminary data at baseline (i.e., prior to treatment) indicate that approximately 14% of pregnant mothers have HIV, 6% have syphilis, 2% gonorrhea and 3% chlamydia infection, while 24% of mothers have trichomoniasis and 49% have BV.

HIV Prevalence— Pregnant and Non-Pregnant Women



Preliminary data on the newborn infants whose mothers did not receive treatment during pregnancy indicate that LCR-detected ocular gonorrhea and/or chlamydia infections occur in approximately 4% of babies, and that 2% of infants have signs of clinical ophthalmia. Low birthweight is around 12% and perinatal mortality is around 46 per 1000 births.

The compliance with collection of placentas has been remarkable, with over 77% of mothers correctly preserving their placentas in formalin. Preliminary pathology suggests that approximately 25% of placentas have histologic evidence of placental membrane inflammation, which can lead to preterm rupture of the membranes and put the infant at risk of premature delivery. Moreover, if the mother is HIV infected, such placental membrane inflammation may facilitate HIV transmission to the newborn.

There is evidence that the mass treatment is having an effect on maternal and infant infections. The study has observed substantial reductions in maternal trichomoniasis and BV prevalence associated with metronidazole treatment during preg-

nancy. At the postpartum visit, the prevalence of trichomoniasis was 5.4% in intervention arm compared with 18.4% in control arm mothers, and the prevalence of BV was 38.4% in intervention arm versus 51.0% in control arm mothers. Similarly, preliminary data suggest declines in gonorrhea and chlamydia infections following azithromycin and cefixime treatment during pregnancy. The rates of maternal postpartum upper GTIs have also been reduced by treatment, particularly if administered during the third trimester. Preliminary data suggest significant reductions in the prevalence of low birth weight associated with treatment. There are also reductions in the prevalence of LCR-detected gonorrheal ophthalmia in the intervention arm babies compared to the controls (0.5% and 1.8%, respectively).

The Effects of HIV on Pregnancy and Implications for HIV Surveillance among Pregnant Women

Screening the entire population allows this study to determine the prevalence of pregnancy in HIV+ and HIV- women. Also, because the project follows women over time, rates of newly recognized conceptions and of pregnancy loss can be determined. Preliminary analysis indicates that women with HIV infection are much less likely to be pregnant than HIV- subjects; the prevalence of pregnancy was 14.2% in HIV+ women as compared with 21.4% in HIV- women ($p < 0.001$). After multivariate adjustment for age, marital status, contraception, breastfeeding, infertility, STDs and sexual behaviors, the relative risk of pregnancy in HIV+ women was 0.45 (95%C.I. 0.35,0.57), relative to the rates in HIV- women. The pregnancy rate was reduced in asymptomatic HIV+ women, and it was markedly lower in women with symptoms of AIDS. Also, the reduction of pregnancy was only observed if the woman herself was HIV+, but HIV infection of the male partner had little effect on the wife's pregnancy rates. Prospective studies show reduced rates of recognized conceptions in HIV+ women (relative risk 0.73; 95%C.I. 0.57,0.93) as well as increased rates of spontaneous abortion among the pregnant HIV-infected women (relative risk 1.50, 95%C.I. 1.10,2.27) (Gray, et al., 1997). Thus, the study concludes that maternal HIV infection reduces the likelihood of conception and increases the frequency of pregnancy loss.

These findings have important public health implications. If HIV-infected women are less able to become pregnant or to maintain a pregnancy to term, then surveillance of the HIV epidemic by monitoring women during antenatal or delivery care, or by infant cord blood testing, could provide seriously biased estimates of the prevalence of HIV. In data from the Rakai STD Control Study, the prevalence of HIV was significantly lower in pregnant than in non-pregnant women (13.8% versus 21.3%, respectively), and the differentials were most marked in younger women (see Figure 1). Thus, monitoring the HIV epidemic by surveillance of pregnant women in Rakai would have underestimated the prevalence of HIV by as much as one third. Moreover, these findings have implications for projections of the number of infants exposed to and infected with HIV, as well as projections of the demographic impact of the HIV epidemic.

Conclusion

Because this study is still ongoing, interim results must be cautiously interpreted. Nevertheless, preliminary data suggest that the treatments are well accepted and well tolerated, and that they can have beneficial effects on maternal and child health. Thus, the Rakai STD Control project hopes that future operations research studies can assess the effectiveness of this and alternate strategies for STD and GTI control in pregnancy so that the most cost-effective procedures can be devised.

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Select Maternal Health Publications Mentioned in this Issue of *MotherCare Matters*

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A QUARTERLY NEWSLETTER AND LITERATURE REVIEW ON MATERNAL AND NEONATAL HEALTH AND NUTRITION

ASSESSING SAFE MOTHERHOOD PROGRAMS—INDIA AND BANGLADESH

Introduction

More than 150 million women become pregnant every year, of which 22.5 million suffer and more than half a million die from serious pregnancy-related complications. In 1987, representatives from around the world gathered in Nairobi to address the unnecessary suffering and avoidable maternal deaths, and in response, many governments have implemented national programs aiming to improve Safe Motherhood. However, impact of these programs has not been systematically evaluated.

Evaluating impact is difficult, in part because few programs have been in place long enough to ensure good implementation. Technical and organizational issues also make impact evaluation challenging; such programs ultimately aim to reduce maternal and neonatal morbidity and mortality rates, indicators which require reliable vital registration systems and complete hospital records for accurate measurement. Reliable surveillance systems are rare in many developing countries, making impact evaluation problematic in these settings. Despite the challenges, countries that are implementing Safe Motherhood programs must consider how they are going to measure the success of their programs.

Recognizing the importance of evaluation, MotherCare recently undertook the task of assessing Safe Motherhood programs in two countries — India and Bangladesh — which together contribute to a quarter of the global maternal deaths yearly. Each government independently requested MotherCare to assess their projects within the national Safe Motherhood programs, but each assessment had a similar purpose: to identify lessons learned from government and non-governmental projects and to recommend strategies to improve future Safe Motherhood and reproductive health interventions. Support from United States Agency for International Development (USAID), The World Bank and The Canadian International Development Agency (CIDA) made these assessments possible. Two evaluation teams composed of a variety of specialists — staff from MotherCare, Indian Institute of Management, London School of Hygiene and Tropical Medicine, CIDA, and Bangladesh Institute of Research for Promotion of Essential and Reproductive Health and Technologies, as well as widely-experienced independent consultants — conducted the assessments.

The teams examined the progress made in Safe Motherhood policies and strategies; human resource development; information, education and communication activities; delivery of essential obstetric care; management information systems; supplies and logistics; and monitoring of the programs. Although some effort was made to understand each program's impact on the long-term goals, the teams focused primarily on process and outcome indicators. The lessons learned from these two country program assessments are invaluable for national policymakers and program planners tasked with refining the new Reproductive and Child Health Program in India and the Fifth Health and Population Program (HAPP-5) in Bangladesh. Many of the lessons are also applicable for national programs in countries of similar settings.

This issue of MotherCare Matters presents the achievements and the shortcomings of both the India and Bangladesh programs. Specific recommendations are made for each country, and lessons from the assessment are discussed in an effort to bring the experiences from India and Bangladesh into a broader context. Learning from the experience of these two programs may help other countries in their efforts to reduce maternal and neonatal mortality and morbidity and make motherhood safe for all women.

Anne Tinker, Principal Health Specialist, The World Bank, and Zahidul A. Huque, Maternal/Neonatal Health Advisor and Technical Manager, MotherCare

SECTION ONE

INDIA PROGRAM REVIEW AND ASSESSMENT

The India Child Survival and Safe Motherhood Program Review and Assessment[1]

TBA Training Session at First Referral Unit in Uttar Pradesh, India

Introduction

In 1996, after four years of implementing the Child Survival and Safe Motherhood (CSSM) Program, the Ministry of Health and Family Welfare (MOHFW) of India invited a team of maternal health specialists supported by MotherCare/USAID to evaluate the Safe Motherhood components of the Program. Over the course of a month, this four-person team traveled to three states of India visiting 31 facilities and interviewing a variety of health providers, clients, and policy-makers. The team's task was to identify lessons learned from the CSSM Program and to provide recommendations for the new Reproductive and Child Health (RCH) Program which was then being planned.

This article provides a brief summary of the CSSM Program, its Safe Motherhood objectives, and the key findings of the evaluation, highlighting achievements, barriers and gaps in the Program. Evaluating India's experience in implementing a Safe Motherhood program not only aids the Government of India (GOI) to improve its own approach, but it is also instructive for other large-scale initiatives aiming to improve their program strategies and implementation.

Background of the CSSM Program

In 1992-93, the National Family Health Survey estimated the maternal mortality ratio (MMR) for India at 437 per 100,000 live births (IIPS, 1995), translating into the death of almost 127,000 women each year (or 21% of all maternal deaths worldwide). Out of the 29 million births each year, 4.5 million are estimated to be severely complicated. Another 12 million pregnancies are unwanted. Approximately 90% of pregnant women in India (24 million) suffer from various degrees of anemia. Each year there are 3.7 million deaths among infants and children (including stillbirths), of which 1.7 million occur during the perinatal period.

Faced with these enormous levels of mortality and morbidity, the MOHFW launched the CSSM Program in 1992 with support from the World Bank, UNICEF, Swedish International Development Agency (SIDA) and the GOI. The

[1] Huque, AAZ, Mavalankar D, Kwast B and M Hazra (1996). *An Evaluation Report Prepared for the Ministry of Health and Family Welfare of India.* MotherCare, John Snow Inc., September 30-October 29, 1996.

Box 1—Strategies for Safe Motherhood Within the Goals of the CSSM Program, 1992-1996

Goals of the CSSM Program

1. Reduce maternal mortality ratio from 437 (1992) to below 200 per 100,000 live births by 2000
2. Reduce infant mortality rate from 110 (1981) to below 60 per 1000 live births by 2000
3. Reduce perinatal mortality rate from approximately 60 (1992) to 35 per 1000 live births by 2000
4. Reduce under-5 mortality to below 10 per 1000 child population by 2000
5. Reduce percent of low birth weight babies to below 20%
6. Increase percent of births with birth intervals greater than 36 months to 30% by 1997

CSSM Safe Motherhood Strategy

1. Promote early registration (between 12 and 16 weeks) of pregnancy
2. Provide universal coverage of tetanus toxoid and iron folic acid for pregnant women
3. Promote timely identification and treatment of maternal complications
4. Promote clean delivery and delivery by trained personnel
5. Promote institutional deliveries
6. Manage obstetric emergencies
7. Promote birth spacing
8. Establish essential newborn care, including exclusive breastfeeding, to improve infant survival

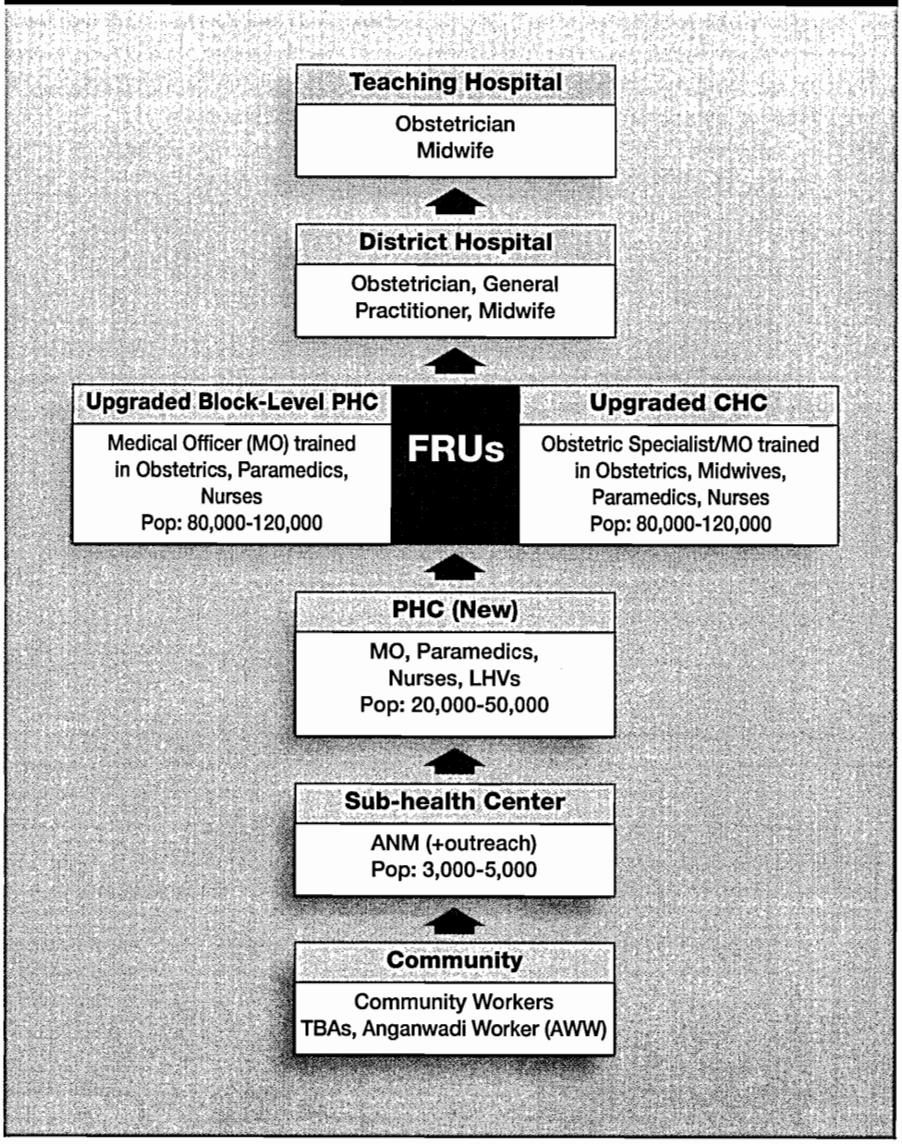
Safe Motherhood component of the Program was originally intended for implementation in only six states, but it was expanded to 20 of the 32 states and territories of India due to policy changes.

The international commitment to reduce maternal mortality by 50% by the year 2000 influenced the CSSM Program to adopt ambitious goals. Recognizing Safe Motherhood as one of its program components, the CSSM Program developed a comprehensive strategy for achieving its goals (See Box 1). Interventions translating strategies into action were to be implemented through a network of health infrastructure (see Box 2). The MotherCare/USAID assessment focused on only the first three goals, with UNICEF evaluating under-five mortality and low birth weight, and the National Family Health Survey looking at birth intervals.

To operationalize the strategies for achieving Safe Motherhood, the CSSM Program focused its efforts on mobilizing communities, training health providers, equipping facilities, influencing policymakers, and generating demand for services. As a key to improving delivery care under the CSSM, 1700 health facilities in the twenty states were designated first referral units (FRUs) to provide **emergency obstetric care** (See Box 3).

A policy shift from a vertical, high-risk approach for child survival to a comprehensive approach for the survival of mothers and children is a key feature of the CSSM Program. Earlier child survival programs were based on vertical immunization programs, which were

Box 2—India Health Service Delivery Structure



highly successful in achieving broad immunization coverage. The CSSM Program, in turn, assumed these vertical programs could be expanded to include Safe Motherhood interventions. But planners did not foresee the complexity of switching to a more integrated approach where **comprehensive essential obstetric care (EOC)** (see Box 3) would be available to all pregnant women. Conceptual issues of **emergency** versus **essential** obstetric care led to programmatic difficulties, and these same issues continue to confuse policymakers and programmers. Furthermore, organizational and logistic issues made it difficult to simultaneously implement extensive training of staff in EOC and upgrade supplies and equipment to support these new tasks.

Evaluating the CSSM Program

Over a four week period (October 1996), the CSSM evaluation team traveled to three states – Madhya Pradesh, Orissa and Uttar Pradesh – where they held discussions with a range of providers and policymakers. These three states were among the six originally selected for CSSM inputs. The evaluation team focused on the following key areas: policy and strategic considerations; human resources development; service delivery; information, education, communication, and counseling (IEC/C); equipment, drugs and supplies; and monitoring, evaluation and research. The assessment criteria included coverage of training of providers, procurement of medicine and equipment, repair of facilities, and actual functioning of the FRUs (as measured by availability of cesarean section or other EOC services).

As part of the assessment, the team:

- ✦ examined utilization to determine service coverage;
- ✦ assessed technical quality by observing and talking with service providers according to a checklist of expected knowledge and behaviors;

Box 3—Understanding Essential Obstetric Care as a Component of Safe Motherhood

Basic maternity care is the mangement of normal pregnancies and deliveries, and it is needed by all pregnant women.

Essential Obstetric Care (EOC) begins with managing pregnancy, delivery, complications and providing special neonatal care. It includes surgical obstetrics (cesarean section, treatment of sepsis, repair of high vaginal and cervical tears, laparotomy, removal of ectopic pregnancy, evacuation of the uterus, amniotomy, craniotomy, symphysiotomy); anesthesia; medical treatment (of sepsis, shock, eclampsia, anemia, intravenous oxytocin); blood replacement; and manual removal of the placenta, repair of episiotomies and perineal tears, and vacuum extraction. EOC also includes labor monitoring (including partograph); the management of problem pregnancies and referral for such problems as anemia, preeclampsia, and prolonged labor; and neonatal special care (resuscitation, etc). Not every case requiring EOC will be an emergency. EOC includes early detection and treatment to prevent the progression of problems so that they do not become emergencies as well as the treatment of severe complications.

A subset of EOC is **"basic EOC,"** which includes all EOC elements except surgery, anesthesia and blood replacement.

Emergency Obstetric Care (EmOC) is another subset of EOC and responds to unexpected complications such as hemorrhage and obstructed labor. It includes all activities mentioned above except for management of problem pregnancies, monitoring of labor, and neonatal care.

Adapted from World Health Organization, 1995.

- assessed facility conditions including the physical infrastructures, operating theaters, labor rooms, equipment and medicine stocks;
- reviewed records and reports;
- gave service providers hypothetical cases in an effort to assess their technical knowledge;
- reviewed program documents, including training modules for doctors and health workers;[2] and
- held focus group discussions (FGDs) with traditional birth attendants (TBAs) to determine their technical skills.

Major Accomplishments in Safe Motherhood

Progress on stated goals of CSSM—The infant mortality rate (IMR) and perinatal mortality rate (PNMR) appear to be declining at a pace required to meet the stated goals of the CSSM. Since the 1980s, India has experienced a significant decline in the IMR, which has dropped from 110 per 1000 live births in 1981 to 74 in 1993 (Registrar General of India, 1995). Given the IMR trend, India is likely to reach its goal of 60 by the year 2000. However, despite the figures, there is skepticism on the part of researchers about the role of the CSSM Program in this decline.

[2] Unfortunately, the IEC/C component was not given adequate emphasis in the evaluation as the team did not have an IEC specialist.

Skills Assessment of an Auxiliary Nurse Midwife

PNMR appears to be declining as well; some estimates for PNMR indicate a projected rate of 37[3] per 1000 by the year 2000, which is close to the CSSM goal of 35 per 1000. MMR is still far behind the target, but it is not clear whether there were flaws in the program strategy which contributed to this failure to achieve the stated objective. However, it is clear that the CSSM Program faced serious delays and implementation difficulties, implying that a change in the MMR should not be anticipated at this time. Furthermore, data collection for both PNMR and MMR is problematic due to event misclassification and underreporting. Finally, the CSSM Program has had some success in reducing low birth weight and increasing family planning use, although the method mix is skewed towards sterilization.

Training—Efforts to train health personnel, improve IEC/C and ensure the supply and maintenance of essential drugs and equipment are key to providing a high caliber of care. Over the course of the Program, 73% of medical officers and 66% of health workers in 20 states received training through the six-day CSSM orientation course which aimed to strengthen the clinical and management skills of medical and paramedical providers. Safe Motherhood, newborn care, program planning, systems support, supervision and monitoring, immunization, cold chain maintenance, control of vitamin A deficiency, ARI control, management of diarrhea, and surveillance are among the topics covered in this training. The CSSM Program developed training materials and has distributed 32,400 sets for doctors (in English) and 68,500 for health workers (in Hindi). Furthermore, to complement its training efforts, the CSSM Program has made essential equipment for EOC[4] available at FRUs.

Monitoring and data collection—In an effort to ensure improved service delivery, the Program has implemented a monitoring system. This system includes a CSSM form and register, an FRU register, and a Coverage Evaluation Survey. Although antenatal registrations have increased since the onset of the CSSM, other service delivery data are not reliable at this time.

Major Gaps and Barriers

Although some strides have been made through the CSSM Program, there remain significant gaps and barriers. For example, despite being a stated component of the CSSM Program, maternal mortality has not been adequately addressed under the Program. Child survival has taken priority, leaving Safe Motherhood initiatives as a secondary objective, with technical assistance to the CSSM Program focused largely on child survival issues.

Role of FRUs—As stated above, FRUs play a crucial role in providing essential obstetric care. However, for effective Safe Motherhood programs, FRUs should be prepared to provide comprehensive EOC, including EmOC *and* basic EOC. Yet, programmers and policymakers have associated FRUs with emergency care only — particularly cesarean section, blood transfusion, and anesthesia.

However, data show that use of these FRUs for obstetric care did not increase significantly over the time of the project in most districts. Given the causes of maternal deaths in India, it is anticipated that up to 80% of maternal compli-

[3] This figure may be underreported by as much as 35%, according to the Evaluation Team.

[4] A list was prepared by the MOHFW following the WHO guidelines in *Essential Obstetric Functions at First Referral Level*, 1987.

Box 4—Recommended EOC Components by Facility Level			
EOC Components	Midwifery First Aid & Family Planning	Basic EOC	Comprehensive EOC
	Sub-centers	PHCs/CHCs (non-upgraded)	FRUs (upgraded PHCs/CHCs)
Parenteral antibiotics	✔	✔	✔
Parenteral oxytocic for third stage of labor and PPH	✔	✔	✔
Parenteral anticonvulsant	✔	✔	✔
Manual removal of placenta		✔	✔
Removal of retained products		✔	✔
Assisted vaginal delivery		✔	✔
Repair of vaginal and perineal tears		✔	✔
Partograph		✔	✔
Newborn care	✔	✔	✔
Medical treatment for complications or existing conditions with special emphasis on anemia	✔	✔	✔
Cesarean section			✔
Anesthesia			✔
Blood transfusion			✔
Family planning services	✔	✔	✔

Source: Huque et al., 1996.

cations could be handled without cesarean sections or anesthesia both at FRU and non-upgraded primary health center (PHC) levels, many by non-physician providers. This conceptualization of the FRUs as EmOC centers may have contributed to a lost opportunity for providing more basic EOC and saving a significant number of women's and newborn's lives.

Training and IEC/C— In moving toward improved quality of care, training has been deemed a critical component. Yet the CSSM training had no hands-on element to prepare staff for providing obstetric care. Furthermore, training of providers and equipping of facilities were not synchronized, with equipment arriving nearly two years post-training. This gap contibutes to poor quality care regardless of how well providers are trained. In addition, prior to developing IEC materials, formative research was not conducted, resulting in materials which were not locally adapted and which lacked a key focus on Safe Motherhood. Moreover, the Program failed to prepare clear guidelines on the use of IEC materials. Although an effort was made to shift to an integrated program, most components of service delivery for Safe Motherhood remained inadequate at the time of the evaluation.

Monitoring and Evaluation—Monitoring and evaluation of the CSSM Program remain problematic as well. Forms have been developed, but data are not available, indicating flaws in implementation. Furthermore, the CSSM Program has missed a potential opportunity to influence policymakers through financial reports, as the financial accounting system makes it almost impossible to see how much money is spent on Safe Motherhood activities

compared to child survival. This structure suggests a need to disaggregate the budgets so that Safe Motherhood activities can be more accurately costed.

Key Recommendations

The evaluation team made several recommendations[5] with respect to the various areas on which they focused. The following are key issues that may prove relevant to other large-scale Safe Motherhood programs.

- **Clarify conceptual and operational issues** related to EOC through workshops for policymakers and program managers at the national, state and district levels. EOC tasks should be delegated to different levels of facilities and providers rather than being concentrated exclusively in FRUs (See Boxes 3 and 4).

  Focusing on EmOC does not allow for early identification of complications and prevention of their progression to life-threatening emergencies. A broader array of essential obstetric care services may help to decrease the severity of complications and ensuing deaths. EOC includes the partograph and management of problem pregnancies (e.g., anemia) plus all the elements listed in EmOC.

  Basic EOC services can be provided at non-upgraded PHCs and Community Health Centers (CHCs) by non-physician providers, such as medically trained nurses and lady health visitors (LHVs). The basic EOC approach does not demand highly trained obstetrician/gynecologist specialists or fully equipped operating theaters and, therefore, has the potential to bring services closer to women. Additionally, all women should have access to basic maternity care, or management of normal pregnancies and deliver-

Box 5— Suggested Key Indicators for Safe Motherhood

- number of pregnant women in the catchment area of service facility
- proportion of pregnant women who received at least one and three or more antenatal visits
- proportion of pregnant women who received at least 90 tablets of iron-folate
- proportion of pregnant women who received two doses of tetanus toxoid
- proportion of deliveries at a health facility
- proportion of deliveries conducted by trained medical/paramedical staff (doctors, nurses, LHVs, ANMs)
- proportion of deliveries conducted by trained TBAs
- number and type of maternal complications treated in the Sub-centers, PHC/CHCs, FRUs and district hospitals
- facility-based number and type of neonatal complications
- facility-based and population-based cesarean section rate
- facility-based case fatality rate for maternal complications
- number of maternal and number of perinatal deaths
- reported maternal and perinatal mortality as a percentage of estimated MMR and PNMR

[5] The complete list of recommendations are available in the full evaluation report.

ies, and EOC will be needed only for those who have difficult pregnancies or complications.

- **Include clinical midwifery (for normal delivery) and counseling skills in the training** of auxiliary-nurse midwives (ANMs), TBAs, and doctors. ANMs are the professional staff closest to village women as they cover a population of approximately 5,000. The ANM must be recognized and respected as a full member of the health team. Furthermore, all providers must have access to protocols for identifying high-risk factors and maternal complications, as well as access to guidelines for interpersonal communication and counseling. Training of doctors must provide a clear explanation of EOC and its sub-components. When training TBAs, venues and trainers should be reevaluated to ensure that they are appropriate for TBAs. Additionally, the content must be adequate to equip TBAs to recognize danger signs of complications and to refer in a timely manner. Overall, the Safe Motherhood component needs to be strengthened and emphasized throughout training.

- **Procure drugs and equipment** according to the epidemiological patterns of maternal and perinatal complications, and expected service utilization. Moreover, procurement should be synchronized with training of staff, and adequate funds must be devoted to continuous equipment maintenance and repair.

- **Strengthen the monitoring and evaluation** of the Safe Motherhood component with a clear list of key indicators (See Box 5) that are printed on the CSSM monthly reporting form. Maternal care registers need to be developed to complement other CSSM registers.

Conclusion

Despite the Program's shortcomings, the MOHFW succeeded in systematically changing its approach to providing maternal and child health services. The CSSM Program was ambitious, aiming not only to shift its strategy from a vertical to an integrated one, but also attempting to scale-up to a nationwide program—all in the course of four years. In this respect, India has truly made progress in changing its service delivery system. With the findings from the evaluation, India has the opportunity to fine tune its approach in the new Reproductive and Child Health Program so that quality care can be made available for all pregnant women, and progress toward the goal of reducing maternal mortality can be achieved.

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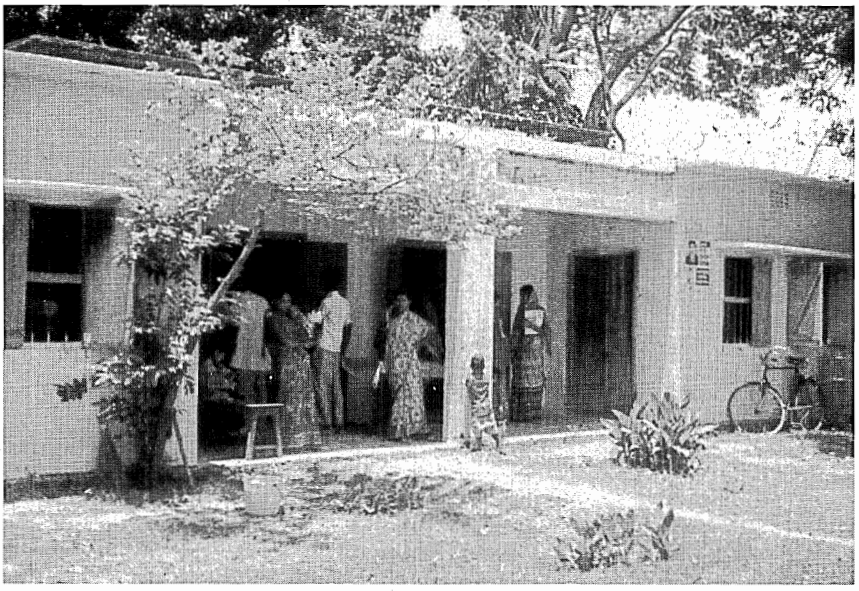
Maternal Health Assessment[1] in Bangladesh



Health and Family Welfare Clinic, Bangladesh

Introduction

In 1997, the Government of Bangladesh (GOB), in the midst of planning their new 5-year health and population program, decided that a Maternal Health Assessment of the existing Fourth Population and Health Program (FPHP) would help to inform this planning process. Aiming to further develop a sector that would be responsive to the needs of clients, particularly women, the GOB commissioned a team of five maternal health experts from a variety of local and international organizations[2] to undertake the assessment. Specifically, the team was asked to evaluate the maternal and neonatal health components of the "Essential Service Package." Also, the team aimed to identify GOB and nongovernmental organization (NGO) projects who had successfully included community participation and women's empowerment elements into their programs. Lessons learned from these projects would be incorporated into the Fifth Health and Population Program (HAPP-5), enabling it to better meet the reproductive health needs of women.

In this article, the preliminary findings of the assessment are discussed, with a particular focus on the achievements of FPHP and successful pilot initiatives. The article then presents some of the remaining challenges for the GOB with respect to maternal and neonatal health and highlights key recommendations for HAPP-5.

Background of the Fourth Population and Health Program

Despite the GOB's longstanding efforts to improve maternal health, the maternal mortality ratio (MMR) remains high at 450 per 100,000 live births (Rahman et al., 1991; Akhter et al., 1996). Morbidities among women of reproductive age in Bangladesh are also high, with 57% of women reporting antenatal morbidities, 26% intrapartum, 62% postpartum and 29% chronic or residual morbidities. Although there have

[1] MotherCare/JSI/USAID, World Bank and Bangladesh Institute of Research for Promotion of Essential & Reproductive Health and Technologies (BIRPERHT). *Maternal Health Assessment.* 8 September - 18 October 1997. (Preliminary Draft).

[2] The team was composed of specialists from the Public Health Systems Group, Indian Institute of Management; a Senior Obstetrician in Bangladesh; BIRPERHT; Canadian International Development Agency (CIDA) and London School of Hygiene and Tropical Medicine (LSHTM) with support from MotherCare/USAID, the World Bank and CIDA.

been few studies on neonatal mortality in Bangladesh, it is estimated that a third to half of all infant deaths occur within the first month of life (Bangladesh Bureau of Statistics, 1996).

For more than ten years, the GOB has recognized safe delivery as a key component to its maternal and child health strategy. The GOB responded to the 1987 global recognition of Safe Motherhood by conducting its first assessment of delivery services for maternal health care in 1988 (MOHFW, 1989). The findings of that assessment influenced the maternal health components of the present program, FPHP, which has spanned the years from 1991 to 1998. During this time, several maternal health pilot projects have been implemented, both in the government and in NGO sectors. Furthermore, the contraceptive prevalence rate (CPR) has risen to almost 50%, and the health infrastructure has been developed through the recruitment of additional female field workers and through the establishment of new satellite clinics at village level, bringing these home visitors to a ratio of 1 to 4,000 population. Moreover, the Bangladesh program has moved from a conventional high-risk approach to early detection of complications and timely and effective case management.

In January of 1997, Bangladesh published the Health and Population Sector Strategy (HPSS), which defines an "Essential Service Package" (ESP) for the health sector. The ESP includes 1) reproductive health care; 2) child health care; 3) communicable disease control; 4) limited curative care; and 5) behavior change communication (BCC). The content of the reproductive health component of ESP is defined as: care and counseling of women during pregnancy, delivery and the postpartum period, including neonatal care; menstrual regulation and post-abortion services; adolescent health care; and family planning services. By the year 2003, the government aims to reduce the maternal mortality ratio from 420 per 100,000 live births (from 1997 data) to 300. The HPSS also recognizes a need for organizational and managerial reform and increased integration of health services at grassroots, *union* and *thana*[3] levels. These needs are also informing the planning of HAPP-5.

Assessing the Maternal Health Components of FPHP

The evaluation team carried out the Maternal Health Assessment over a six-week period in 1997, meeting with officials at the Ministry of Health and Family Welfare (MOHFW), directorates of Health Services and Family Planning, and Project Directors of both GOB and NGO projects.

As part of the assessment, the team:

- ✦ reviewed project documents and conducted field visits in seven districts with special projects;
- ✦ visited hospitals, health centers, and maternity clinics, and interviewed field workers and villagers;
- ✦ observed the coverage and quality of services; and
- ✦ discussed maternal health issues with senior providers, patients, and community volunteers to determine their perceptions of the quality of care.

The assessment team highlighted two areas: maternal health services, and management issues. At the request of the GOB, the team examined these broad, cross-cutting areas to demonstrate FPHP's ability to move toward a more integrated approach. Within the assessment of maternal health services, the team specifically looked at BCC, antenatal care, delivery and neonatal care, emergency obstetric care, postnatal care, abortion, family planning, referral and utilization. Complementing this service delivery review, the team explored coordination of services and quality mechanisms such as standards of care, training methods, and monitoring and supervision. They also considered the importance of personnel and finance management, facility design and maintenance, logistics, evaluation, and research in achieving the objectives of the health program.

[3] A *thana* is a subdistrict with a population of 200,000 to 400,000. It is composed of appoximately 10 *unions*; each *union* has 3 wards or 4-6 units.

Box 1—Summary of GOB Health Services

The primary health care system includes grassroot-, *union-*, *thana-* and district-level care.

At grassroot level —Family Welfare Assistants (FWAs), Health Assistants (HAs) and Traditional Birth Attendants (TBAs) are the providers. More than 45,000 TBAs had been trained as of October 1997. They provide promotive and preventive services and conduct 26-30% of deliveries in the rural areas. About 23,000 FWAs have been trained to provide family planning services. Immunizations are also provided at this level. A large number of male health assistants also provide domiciliary services that include vitamin A capsule distribution, detection of malaria cases and diarrhea treatment and prevention, among others. The population served by an FWA or HA is approximately 5,000-6,000.

At *union* level

—*Union* Health and Family Welfare Centers staffed by FWVs and SACMOs provide family planning, antenatal care, and promotive and simple curative services to rural populations (approximately 20,000).

—Rural Dispensaries are staffed by doctors (with MBBS degrees) and SACMOs.

—Two Satellite clinics are held every week. The FWV provides promotive and preventive services (including ANC, family planning and immunizations), together with the treatment of minor ailments.

—The Family Planning Inspector (FPI) supervises the work of the FWA and carries out motivational activities for family planning among men.

At *thana* level —There are 349 *Thana* Health Complexes (THCs) which provide preventive and curative service. Basic EOC is available at this level. Each THC serves a *thana* with populations of 200,000 to 400,000.

At district level —There are 64 Maternal and Child Welfare Centers (MCWCs). Comprehensive EOC is available at this level. Each MCWC serves a population of 1 to 2 million. Comprehensive EOC and secondary curative care are provided at 64 district hospitals. Size of each hospital is variable from 50-250 beds. These hospitals are being upgraded to 200-250 beds. Each district hospital serves a population of 1 to 2 million.

Tertiary specialized curative care is provided in 13 medical college hospitals. There are also 12 private medical colleges. The Institute of Post-Graduate Medicine and Research (IPGMR) is government supported. Specialized hospitals are administered both privately and by the government.

Major Accomplishments in Maternal Health Care

Bangladesh has developed an impressive infrastructure for health and family planning services, extending from the community to medical college levels (See Box 1). A variety of trained providers are available, including:

- ✦ Clinical staff [Medical Officers (MOs), Resident Medical Officers (RMOs), Sub-assistant Community Medical Officers (SACMOs)]
- ✦ Paramedics [Senior Staff Nurses (SSNs), Family Welfare Visitors (FWVs)]
- ✦ Supervisors [Family Planning Inspectors (FPIs), Health Inspectors, Senior Family Welfare Visitors, *Thana* Health and Family Planning Officers (THFPOs), and *Thana* Family Planning Officers (TFPOs)]
- ✦ Field workers [Health Assistants (HAs), Family Welfare Assistants (FWAs)]
- ✦ Traditional Birth Attendants (TBAs)

The GOB remains committed to supporting this diverse cadre of health and family planning providers.

Political Will—One of the major strengths of the Bangladeshi health system is the political commitment and support behind the family planning program. FWAs conduct community outreach, taking family planning messages and methods into the rural communities. Through this strong outreach program, Bangladesh has managed to raise the CPR from 11% in 1978 to almost 50% in 1996. FWAs are responsible for verbally checking pregnant mothers to identify high-risk pregnancies and signs of complications. This strong commitment to support family planning efforts presents an opportunity for Bangladesh to strengthen its maternal health program by building on existing channels of communication and service provision. A similar level of commitment is required to provide 24-hour emergency obstetric care in hospitals, 365 days a year, to complement the promotive and preventive field level services.

Behavior Change Communication (BCC)—Under HAPP-5, policymakers and health service managers are committed to BCC among both providers and clients in all areas of health care, including maternal and neonatal health. In addition, the mass media and NGOs appear willing to confront sensitive issues. Within this strategy, the government and NGOs have produced a number of videos, and television shows broadcast a recurrent theme of the "green umbrella," a visual symbol raising awareness about heath care. Various projects have produced posters, flipcharts and other printed materials to aid health workers in communicating health messages. In addition to these important communications materials, the BCC strategy requires improved interpersonal communication among providers and between providers and clients. The strategy aims both to improve quality of services and increase demand and utilization of such services.

Training and Service Delivery—Bangladesh succeeded in improving its service coverage, with 85% of pregnant women currently receiving at least one antenatal care visit (Akhter et al., 1996). Although antenatal care coverage is high, most antenatal care is provided in the home primarily by TBAs or other community providers, and only 26-36% receive antenatal care from a doctor, nurse or midwife. When women attend antenatal care at maternal and child health clinics and health centers, they are given education on diet and rest, and immunization with tetanus toxoid. (In fact, tetanus toxoid coverage for pregnant women is high at 75%).

Despite the plethora of health providers/services and the communication campaigns to improve knowledge and attitudes toward services, most deliveries still occur in the home (much like antenatal care), most without a professional attendant. Trained TBAs conduct 26-32% of deliveries in the home, and their performance is somewhat improved over that of untrained TBAs. Trained TBAs use plastic sheets during delivery, boil instruments, and wash their hands prior to delivery more frequently than their untrained counterparts. Some professional providers also attend deliveries in women's homes.

Family Welfare Visitors and the faculty of Regional Training Centers have completed hands-on clinical skills updates. Moreover,

increasing numbers of qualified obstetricians and anesthetists are available in District Hospitals, raising the potential to improve supervision of medical officers and, in the future, increasing the pool of trained team members at local and national levels. One maternal care pilot project[4] has initiated limited training of ancilliary staff (such as cleaners), recognizing that these staffpersons have an important role in more effective communication with women.

Innovations in Improving Quality of Care

Several other pilot projects have implemented innovative programs in an effort to improve the quality of care in maternal health services. For example, in one area of Chandpur district, the Bangladesh Association for Voluntary Sterilization trained village nurses *(Palli Nurses)* to perform normal deliveries, and to recognize and refer complications. These women, with a prerequisite of eight years of basic schooling, are carefully selected by their community to receive two months of training, which includes observing three to five and conducting at least ten normal deliveries. Unlike many trained senior providers, *Palli Nurses* are eager to provide "hands on" delivery services. Moreover, *Palli Nurses* work out of their homes in the villages, and they are empowered by performing valued work in their communities. With the training program in place, 90% of pregnant/postnatal women in the project area receive antenatal care and postnatal visits from *Palli Nurses. Palli Nurses* also conduct 64% of deliveries in the project area. Among these deliveries, the stillbirth rate is 25 per 1000 deliveries, and the neonatal mortality rate is 29 per 1000, which are lower than national rates (41 and 53 respectively).

> ***"Women won't go to the hospital to deliver if the behavior is bad. If there is a benefit of going to the hospital, if medicines and supplies and the doctors are there, of course we will go."***
>
> *-a village woman, when asked why people don't go to the hospital for delivery*

In another pilot project, the Red Crescent Society, Community Midwives with four years of training and Junior Midwives with 18 months of training (following at least eight years of basic education), provide delivery services. In this pilot project population, the MMR fell from 410 to 230 per 100,000 live births (although numbers may be too small to make a valid comparison).

Cost issues—With pressure to find mechanisms for cost recovery, some hospitals are forced to charge clients for their services. However, in NGO hospitals where this is the case, charges are visibly displayed. Clearly posting the schedule of fees helps with cost recovery strategies and hinders the practice of double-charging. Moreover, some hospitals have created innovative mechanisms to keep these costs minimal. For example, one project offers discounts on deliveries for those who have attended antenatal care at the hospital or one at of their outreach clinics.[5]

Major Gaps and Barriers

Despite all of the positive and innovative changes discussed in the previous section, Bangladesh continues to face significant challenges in its effort to improve maternal and neonatal health. The bifurcation of health and family planning services, a predominant problem in Bangladesh, has led to a duplication of efforts and a lack of coordination that has created mixed messages, particularly in BCC strategies, and in monitoring and evaluating quality care. The array of providers and the diversity of services required at field and institutional levels continue to challenge Safe Motherhood in Bangladesh. Indeed, defining the duties and responsibilities of the various providers presents a challenge in and of itself. Policymakers, users, and providers themselves can easily confuse the roles of the

[4] *Thana* Functional Improvement Pilot Project.

[5] World Mission Prayer League, Inc. LAMB Hospital in Bangladesh.

traditional birth attendants, paramedics, and medical providers.

BCC—BCC strategies are lacking both in quantity and quality. Few materials explain clearly the signs of complications in pregnancy and exactly how the client and her family should prepare for action in case of development of a complication. During the assessment, although print materials were available for health workers, there were few available for clients to take home. Where take-home materials existed, it appeared that rural people did not always understand the messages. This problem indicates a need for more rigorous pre-testing with an appropriate audience. The assessment team also found that the technical content of some materials was incorrect, indicating a need for quality control during design and production. Moreover, some materials designed for providers were produced in English only, limiting their utility as tools for interpersonal communication with clients. Although BCC is to be targeted at providers as well as clients, details of how to implement changes have not been elaborated, nor has there been any pilot testing of this initiative.

Monitoring—Overall, programs lack monitoring and quality control for improved management. Monitoring and evaluation efforts tend to emphasize numerical service statistics, rather than quality of care and the orientation to clients' needs. Additionally, local managers need to be able to analyze and understand the significance of the data they are asked to collect in relation to expected numbers of normal and complicated deliveries in their catchment populations.

Training—Although FWAs play a crucial role in providing family planning and health care messages to communities, they are not well prepared in BCC for maternal care. They do not offer women any take-away materials regarding pregnancy and childbirth. At the professional level, nurses and doctors generally have poor interpersonal communication skills and negative attitudes toward clients. In addition, the male cadres, family planning inspectors and health assistants are not well prepared to reach men on an interpersonal level. This is a lost opportunity since the role of men is crucial in deciding whether or not to seek care for their spouses, daughters, sisters and daughters-in-law.

Training of all health providers continues to rely heavily on rote learning; clinical practice during training remains undervalued and poorly supervised. Moreover, health care ancillary staff (such as cleaners) generally receive no training. However, they are regularly involved in vital functions such as personal patient care, sterilization of equipment, and they may be found assisting with deliveries and other clinical procedures.

Service delivery—Coupled with poor communication skills and a lack of clinical training on the part of providers, organizational issues also contribute to a low proportion of clients receiving services from professional attendants. For example, at the district hospitals and medical colleges, pregnant women must wait with all other gynecological patients. Even those with serious complications often end up waiting for several hours, increasing their risk for mortality and morbidity. The waiting place is typically crowded and dirty. Care for young children who accompany their mothers is virtually nonexistent.

TBAs may be more accessible to many women than are professional providers, but even trained TBAs, like many professionals, continue to ask women to bear down during the first stage of labor and continue to perform multiple vaginal exams. They also deliver in the supine position more than untrained TBAs. Village doctors, most not trained in clinical skills, who often use incorrect treatments (such as intramuscular syntocinon to intitiate contractions), are called upon when labor is not progressing normally. This wastes critical time needed to manage complications by clinically skilled providers. Postnatal care is not well organized and is primarily provided by TBAs. Coordination among various levels of care is lacking, and even where referral systems are in place in project areas, they rarely function well.

Institutional deliveries can also be risky because of lack of sterilized equipment, lack of emergency drugs, and poor hygiene practices

of providers. One team member noted that this type of institutional delivery is, in many respects, very similar to that performed by an untrained TBA. In higher referral centers, obstetricians spend substantial time with normal cases that could be well handled by trained midwives. Dysfunctional staffing configurations, unclear job descriptions, and under-skilled staff or staff who lack confidence in their skills, are some of the problems facing the provision of comprehensive EOC on a 24-hour basis, 365 days a year, as required.

To compound these staffing problems, equipment is frequently not working or is inappropriate. Many of the facilities are poorly designed in terms of patient flow, consideration of traditional practices, lighting and ventilation, among others. Furthermore, there are frequent delays in receiving prompt treatment because family attendants have to purchase drugs and blood. To provide quality EOC, well-maintained suction and anesthetic machines are required, as well as uninterrupted supplies of emergency drugs and other consumables. Most facilities are not prepared for providing quality EOC services, as they lack appropriate supplies and equipment, maintenance of facilities, and the necesary technical and interpersonal skills to provide quality services. The challenges are systemic, requiring change on a variety of levels to overcome the barriers to improving quality care.

Key Recommendations

The maternal health assessment has identified several areas for emphasis for the new program of the GOB. This section outlines the key recommendations for attaining the goal of improving the quality of maternal and neonatal health care within the scope of HAPP-5. Although these recommendations are preliminary and remain under review within the Bangladeshi context, they do provide some useful lessons for other large-scale programs.

- **Create awareness** of healthy behaviors during pregnancy, delivery and the postpartum period and **generate demand** for use of maternal health services and for client-sensitive behaviors among health service providers. BCC materials need to be analyzed and their use evaluated to determine their effectiveness. BCC interventions targeted at providers will facilitate the transition of providers to a more client-oriented approach. BCC efforts directed simultaneously to the community and providers will help to create an awareness of services and quality standards in such services, thus increasing demand.

- Expand and improve the **quality of normal delivery at home by trained providers** and introduce **postpartum visits.** This effort should build upon the successes of pilot projects where locally-recruited women were trained to provide midwifery services. Selected FWAs, who provide outreach services to all women of reproductive age, should receive basic midwifery training. TBAs must continue to receive training in the detection of complications, referral, postpartum care, and avoidance of harmful practices. Linkages among midwives (FWVs/Nurses), TBAs and FWAs must be improved to assure quality services and adequate referral systems. Additionally, program planners should take advantage of existing program components where service utilization is high (tetanus toxoid and family planning visits) to screen for pregnancy complications and advise women about danger signs and contingency plans they and their families need to take in case they suffer a complication.

- Expand and improve the **quality of essential obstetric care (EOC).** Efforts should focus on the *Thana* Health Complexes (THCs), selected on the basis of population served, road communications and staff configuration, upgrading them so they can provide basic EOC (basic EOC plus surgery, blood transfusion, and anesthesia) services. A few select THCs should be upgraded to provide comprehensive EOC, with expansion to additional THCs once the effectiveness and demand of the pilot projects has been determined. Blood transfusion capacity must also be available in all basic and

comprehensive EOC facilities. Standards for quality care must be established, and staff must be trained accordingly.

- Establish effective **linkages** between community and health facilities **for referral.** It is essential that this initiative involve both community members and providers. Providers will need training on proper management of the referral system, and efforrts will need to be made to bring the traditional and formal medical systems together.

- Develop an effective **management information system.** Instruments for data collection and monitoring must be user friendly, integrated so that family planning and reproductive health systems are linked. Moreover, they should be easy to analyze and use by staff at the THC, district, and national levels for management and planning purposes.

- Provide **technical guidance** to the design, implementation, monitoring and evaluation of maternal health programs from **the national level.** This effort will help to ensure that programs are relevant to national objectives and meet national standards. To meet national standards, the GOB will also need to clarify the roles of the various providers in provision of treatment and referral specificallly, so that policymakers, providers and clients understand the responsibilities of each provider and duplication and gaps can be avoided. National guidance will also help to promote leadership for maternal health interventions and research issues.

Conclusion

Although Bangladesh has made significant gains in its efforts to improve quality of care for maternal health, several barriers continue to challenge the initiatives of FPHP. The MotherCare assessment team has found both strengths and weaknesses in the Bangladeshi program and offers recommendation for overcoming the barriers to improved care for mothers and newborns. Over the past years, the FPHP has supported innovative projects and had begun to build on successes of its other health programs such as family planning. However, the systemic challenges are complex and require time for change. Bangladesh has the opportunity to integrate the recommendations made by this team into its new health program, thereby enhancing efforts to provide quality maternal and neonatal health care.

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COMMENTARY

In any Safe Motherhood intervention, program monitoring and evaluation are essential, not only to determine program results, but also to feed information back into the program so that intervention strategies can be refined. Monitoring and evaluation can help to improve the quality of programs, and, as an integral part of the intervention, they assist program implementers to rethink activities and overcome gaps and barriers to achieving stated goals. Although impact evaluation is of most interest to policy makers, monitoring programs and evaluating process and outcome indicators are also of great value, especially to program managers. The assessments undertaken in India and Bangladesh primarily reflect process and outcome evaluation, leaving impact indicators (e.g., mortality reduction) for a later stage.

Both of the programs discussed in this issue of MotherCare Matters are national-level programs. They integrate all levels of providers as well as the community in an effort to improve both demand for services and the quality of services provided. Despite some shortcoming and future challenges, each program has succeeded in progressing toward a more integrated approach to maternal health. The India and Bangladesh experiences provide universal lessons for other large-scale programs aiming to improve maternal and child care. Below are some of the specific lessons learned:

- From the onset, **programs may be delayed** due to problems in financing strategies, frequently attributable to donor agencies. In the case of India, the international development assistance credit scheme delayed the program by more than one year. **Delays in start-up date can affect feasibility of achieving goals.** Moreover, **goals must be realistic given the timeline of the program,** and baseline data must be available to make realistic assessments of the change in indicators.

- **Policy decisions can dilute** the strength of targeted programs. In India, policy decisions led to an expansion of interventions for Safe Motherhood to be operational in 20 states, instead of the originally targeted six states. This policy decision created pressure to implement the program in more than twice the area than originally planned but with the original level of funding. **Programs must be flexible enough to respond to the political environment, but politicians need to realize the impact of their decisions on program effectiveness.**

- **Political commitment** can facilitate the implementation process. Technical guidance for program development, implementation, monitoring, and evaluation of Safe Motherhood programs must be supported with commitment from top political and management leaders in the country. For example, in Bangladesh, the political commitment behind the family planning program has been high, leading to strong programs promoting contraceptives. Consequently, contraceptive prevalence rates have increased significantly over the past three decades. This same level of political support for Safe Motherhood programs will help to make these interventions priorities, not only among program managers, but also community and family leaders.

- **A lack of conceptual understanding** of the specific services being delivered can cause confusion and lead to lower quality of services as well as misdirected interventions, impeding the ability to achieve stated goals. Program planners need to be clear about what types of services will be provided at what level, and how these services are intended to impact the program objectives. Moreover, large-scale programs

require acknowledging regional disparities which may make national indicators difficult to interpret.

In the CSSM Program of India, there was confusion both on the part of policymakers and providers as to what kind of services first referral units provide. The importance of provision of essential obstetric care at various health facilities was undermined by a focus only on cesarean section, anesthesia and blood transfusion. These interventions are important life savers, but many basic obstetric interventions (such as evacuation of retained products after incomplete abortion, manual removal of retained placenta after delivery, antibiotics for sepsis, oxytocics for reduction of postpartum hemorrhage, first aid to stabilize women with hemorrhage and eclampsia, management of prolonged labor, management of severe anemia, and resuscitation of the newborn) can be provided at the primary health-care level. Provision of such services in places closer to women can manage mild obstetric complications before they become serious.

In Bangladesh, confusion stems from the multitude of providers and the lack of clear descriptions of roles and duties of specific providers. One way to avoid confusion and resulting gaps and/or duplication is to have standard descriptions for each level of provider and to share these descriptions with all providers during training.

- Program planners and implementers must **strike a balance between improving care for normal deliveries and for complicated deliveries.** Strengthening the capacity of those who traditionally attend normal deliveries may help them to screen for and manage complications at an early stage. These providers must be aware of referral mechanisms, including transportation and other access issues. **Bringing midwifery services close to women's homes and timely referral of women to appropriate health facilities in the event of complications they cannot manage** are two key strategies for a maternal health program.

- **Community involvement** is key to supporting families throughout pregnancy, delivery and the postpartum period. Community leaders and family members need to be aware of possible complications and their signs, and where and how to seek appropriate help. Conducting formative research to determine knowledge, attitudes and behaviors will help in the development of communications materials and in the way services are provided. Improving the perception of health services on the part of the community/client will help to generate demand for services. Additionally, although producing quantities of materials is important, if such materials (e.g., pamphlets) lack relevance to targeted groups, quantities become meaningless. In both India and Bangladesh, although materials were developed, messages on Safe Motherhood were weak and their relevance to local populations was slight.

- Safe Motherhood programs require an **integrated and synchronized effort** to improve the quality of care in health facilities and to improve the decision-making process of the community for prompt care-seeking behavior. This effort includes **making quality care available and generating demand for essential obstetric care,** both of which are necessary for reduction of maternal mortality. To increase demand for use of services, community needs and perspectives must be identified and incorporated into the Safe Motherhood programs. Improved quality of services will result from increased training in clinical and interpersonal skills as well as follow-up with general management techniques. Finally, supply and distribution networks must be in place so that trained and competent providers have the necessary equipment to do their jobs well. Large-scale programs must recognize that moving from a vertical to an integrated approach takes time, and that to evaluate impact, programs

must be in place for a relatively long period of time (at least ten years). While such systemic changes take time, failure to address all components can lead to weakness throughout the program. For example, in both India and Bangladesh, training of providers and equipping of facilities did not coincide, leading to a lack of confidence by clients that quality services could be provided.

- It is important to **encourage innovative approaches to providing maternal health care,** but such pilot projects must be validated on a small-scale before they are implemented at a national level. Scaling-up requires an understanding not only of what works, but why and how it works, as well as what may diminish or enhance the approach on a larger scale.

The lessons learned from Bangladesh and India provide a rich resource for policy makers, program implementers and evaluators involved in large-scale Safe Motherhood programs. The challenges are many, but with coordination and dedication, they can be overcome so that more effective programs and a higher caliber of care will be available to clients, and the goal of Safe Motherhood can be achieved.

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ANNOUNCEMENT: The Association of Agricultural Medicine and Rural Health in India and the Comprehensive Rural Health Project are jointly organizing an **International Conference on Woman and Child—Health, Empowerment, Rights and Development,** on November 14-16, 1998, in Loni, India. For more information and registration materials, please contact the Conference Secretariat:

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FAMILY-CENTERED MATERNITY CARE—MOTHERCARE'S APPROACH IN UKRAINE, MOLDOVA AND RUSSIA

Introduction—FCMC Project Overview

The Newly Independent States (NIS) of the former Soviet Union have struggled with the Soviet legacy since their transition to open societies, particularly in the realm of health care. Hospital sanitation, public health, medical equipment and supplies and their distribution, food quality and safety, and the delivery of medical services are all in grave need of reform.[1] As with most of the medical services, maternal health care follows a strict medical model in the NIS. Typically, women deliver alone without partners or family members to support them, are discouraged from ambulating during labor, and receive enemas and perineal shaving prior to delivery. After delivery, babies are taken from their mothers and kept in the nursery since 'rooming-in' of mothers and babies is not a routine practice. MotherCare initiated work in Ukraine, Moldova and Russia with the goal of improving the maternity care systems in these countries through a Family-Centered Maternity Care (FCMC) approach.

This issue of MotherCare Matters is dedicated to Bonnie Pedersen, a midwife and ardent advocate for women and children around the world. With the American College of Nurse Midwives (ACNM) in the early 1980's, Bonnie began the Special Projects Section to expand the work of midwives in the US and abroad. This issue focuses on the work of the ACNM with MotherCare to introduce Family-Centered Maternity Care in Ukraine, Moldova and Russia.

The FCMC approach is generally familiar to maternity health care providers and clients in the United States but is a new concept in the NIS (See Box 1). FCMC focuses primarily on meeting the informational, social, emotional and physical needs of pregnant women and their families during pregnancy, childbirth and postpartum. The approach emphasizes education and preparation for childbirth so that a woman and her family can assume more active roles.[2]

The principal objective of the MotherCare/Ministry of Health projects in the three countries (Russia, Moldova and Ukraine) was to strengthen the quality of reproductive, maternal and newborn health services as perceived by the client and the provider. In Moldova and Russia, qualitative research was conducted to determine how women and their partners viewed the quality of maternal and newborn care services. These client perspectives were incorporated into the clinical training and counseling courses given to providers. In Ukraine, a study of the Family-Centered Maternity practices was conducted to determine the cost impact of the integration of an FCMC approach within the traditional maternity system.

[1]Davidow, SL (1996). >Observations on health care issues in the former Soviet Union. *Journal of Community Health*. 21:1, 51-60.

[2]Judith Rooks, CNM, DrPH

Box 1—Definition of Family-Centered Maternity Care

Family- Centered Maternity Care (FCMC) is designed to meet the informational, social and emotional and physical needs of pregnant women and their families during pregnancy, childbirth and postpartum. Emphasis is placed on education and preparation for childbirth so that the woman and her family can assume more active roles. FCMC invites the family's supportive presence during labor and birth, and focuses on enhancing and supporting the normal birth, screening for deviations from normal birth, and intervening only when deviations occur.

FCMC avoids the unnecessary use of invasive, uncomfortable or restrictive procedures. The approach encourages women to remain active during labor—to walk, sit up, change positions frequently and assume whatever position is most comfortable (avoiding the supine and lithotomy positions). The approach also supports women who want to assume squatting and other upright positions for the second stage of labor and birth. FCMC provides for skin-to-skin contact between mother and newborn immediately after birth, minimal separation of mother and infant, and early initiation of breast-feeding. It also promotes rooming-in and other practices which facilitate breast-feeding and encourages contact between the newborn and other family members.

—Judith Rooks, CNM, DrPH

For the FCMC approach to be adopted in the NIS, the studies concluded that modest changes must be made to the physical infrastructure of maternity services, but significant changes need to be made in provider-client interactions and sensitivities.

After introducing FCMC to Ukraine, Moldova, and Russia, MotherCare developed a list of key lessons for program planning and implementation. First, FCMC is cost-effective when integrated with traditional birthing practices. Secondly, FCMC is an acceptable and feasible concept for these countries if the following conditions are met:

- ✦ country providers and administrators are given adequate validation and rationale for the evidence-based FCMC practices;
- ✦ the practices are demonstrated by an experienced team of trainers, including an obstetrician and midwife;
- ✦ the trainers provide an opportunity for the providers to develop clinical competencies and to use a team-based approach for the birthing process;
- ✦ there is early and continued commitment and involvement of district and hospital administrators and providers in planning for changes in practices, implementation and in monitoring results.

MotherCare's experience has shown that if the above conditions are met, sustainability can be achieved.

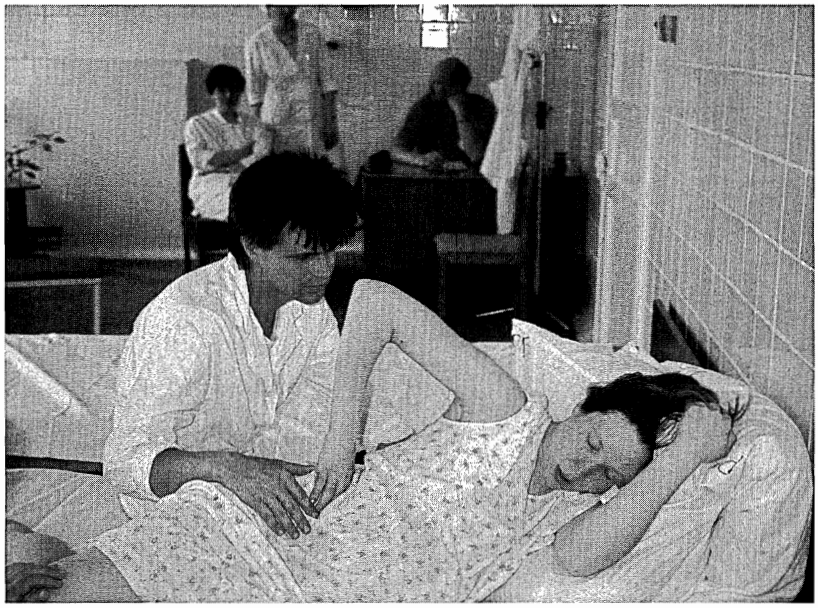
Colleen Conroy
Deputy Director, MotherCare

SECTION ONE

FAMILY-CENTERED MATERNITY CARE IN UKRAINE

Family-Centered Maternity Care Training of Trainers in Ukraine— Planned Change for Sustainability

Pauline Glatleider, C.N.M., M.N. (MotherCare/ACNM)



A single, young Ukrainian teenager was embarking on the journey to motherhood and the pain and fear of labor was etched on her face. Other women were in the labor ward that afternoon all together in the same room, but each very much alone. The sounds of labor and birth were audible to all. The young teenager featured in this story agreed to participate with the author, a certified nurse-midwife (CNM), in a one-time demonstration of Family-Centered Maternity Care (FCMC). The demonstration had been requested by the maternity center obstetrician after attending a lecture on FCMC. Guided by the CNM consultant, this young woman walked and showered during her labor. Members of the maternity care staff observed the process. A staff midwife asked to participate and was shown how to give labor support. The young woman moved through labor quickly, giving birth while lying on her side. Her newborn was placed skin-to-skin and started breast-feeding within ten minutes. The new mother was proud of herself and her newborn. Rooming-in together, a practice already incorporated within the maternity center, helped establish breast-feeding. This young mother's courage inspired a group of seasoned professionals to change: From this initial one-time demonstration, FCMC has evolved and gained a strong foothold in two maternity care wards in the Ukraine as well as in neighboring institutions.

Background

People facing the challenge to change require continued guidance, from the initial vision for change through the journey, to the completion of systemic change.[1] The process of integrating FCMC practices into the reproductive health care system of Ukraine provides a tangible example of planned change.

The initial needs assessment identified the current use of outdated and ineffective maternity care practices in the Ukraine.[2] Antiquated sanitary regulations from the former Soviet Union are still mandated by the Ukrainian Ministry of Health. These regulations impede every aspect of FCMC.[3] The challenge faced by MotherCare was to convince experienced providers and policy makers that change was needed and that

[1] Smith, D.K. (1996). Taking charge of change. Massachusetts: Addison-Wesley Publishing.

[2] Rooks, J. (1994). Reproductive health seminar trip report. Washington, D.C: MotherCare.

FCMC was the model to implement. One answer was found within the FCMC model itself; FCMC is *evidence-based* maternity care. FCMC emphasizes the normalcy of pregnancy and birth and the appropriate use of technology. FCMC also advocates the active participation of the woman and family in her pregnancy and birth, practices that have been recommended by the World Health Organization[4] and supported by scientific research reviewed in the Cochrane database for pregnancy and childbirth.[5] Aspects of FCMC have been an integral part of maternity care in Europe and the United States for two to three decades and have been shown to be a safe, satisfying and cost-effective model of care.[6] The compelling evidence that supports FCMC and a recent successful experience in the Ukraine with rooming-in facilitated the initiation of FCMC.

Methods

Planned change needs to incorporate both supporting and opposing positions. Individuals representing these interests must be able to dialogue so that resistance does not intensify.[7] A multidisciplinary team approach was used to facilitate the introduction of FCMC into the Donetsk Regional Center for Mother and Child Care and the Odessa Regional Maternity Center.

A Technical Working Group (TWG) was created to give every discipline and administrative level a voice in this process. The purpose of the TWG was to develop, support and facilitate the implementation of FCMC at all levels of care. The TWG was responsible for the overall plan, technical support, implementation, evaluation and continuation of FCMC. The group was composed of six members: a midwife, obstetrician, neonatologist and deputy director from the site, plus a regional maternal-child health administrator and a regional sanitary epidemiologist. In putting together a TWG, member expertise should include one or more of the following: a strong professional belief in the FCMC model, curriculum development, teaching skills with women and professionals, research, policy development and implementation, financial knowledge, and community leadership. The team in the Ukraine met these criteria.

A two-week evidence-based/competency-based FCMC Training of Trainers (TOT) curriculum was developed incorporating the collaborative model of midwife-doctor management as practiced in the United States and Europe. The TOT included one week of theoretical preparation and one week of clinical training with 24-hour coverage. A continuous quality assurance FCMC monitoring system was developed for implementation during the clinical week.

The short-term goals of the TOT were to create a core group of FCMC trainers and establish the role of the TWG. The long-term goals were to create a model FCMC program at each site where service and further training in FCMC would be provided. Further, the core FCMC trainers and the TWG would provide local and regional maternities with technical assistance for additional FCMC site development. The overarching goal for this strategy of planned change was to integrate the FCMC philosophy and model of care into the maternity care services of Ukraine.

Process

The TWG members from each site reviewed the proposed curriculum with the MotherCare consultants. Benchmarks were developed by the team for the quality assurance FCMC monitoring system. Because the Ukrainian health professionals played a significant role in designing the quality assurance system, they could assume ownership of the training and help identify local support and barriers (regulations and personnel) to implementing FCMC. Agreement was reached on the composition of the group to be trained in FCMC. The group of trainees consisted of a multi-disciplinary team

[3] Glatleider, P. & Swartz, W. (1996). FCMC technical working group meeting. Washington D.C.: MotherCare.

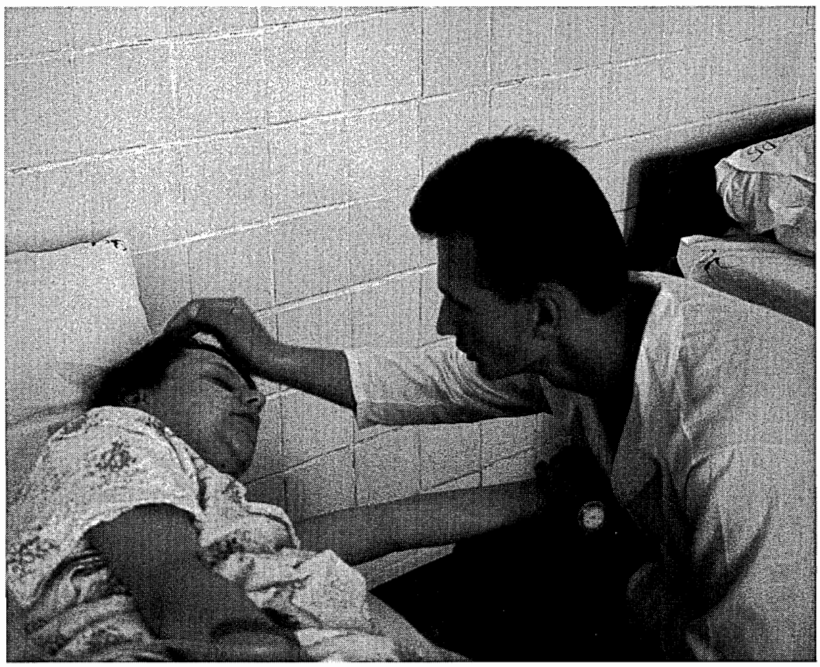
[4] WHO (1985). Appropriate technology for birth. Lancet ii, August 24, 436-437.

[5] Enkin, M. et.al., (1995). A guide to effective care in pregnancy and childbirth, second edition. Oxford University Press.

[6] Appleton, J. & Corry, M. (1996). 'Family-centered maternity care: A model for safety, satisfaction and savings,' in Managing Employee Health Benefits. Summer, 4 (4), 13-19.

[7] Smith, D.K. (1996). Taking charge of change. Massachusetts: Addison-Wesley Publishing.

with four midwives, one obstetrician and one neonatologist from Donetsk and Odessa. The MotherCare training team included two certified nurse-midwives and one obstetrician. The first FCMC TOT was conducted in May 1996.



Results

Subsequent to this training, each site implemented their "action plan" to create a model FCMC program. Since March 1997, FCMC has been offered as a part of the maternity care services at the Odessa Regional Maternity Center and the Donetsk Regional Center for Mother and Child Care. Site visits in September 1997 evaluated the implementation of FCMC and provided further technical assistance for the monitoring system. An Advanced FCMC seminar was recommended for these sites in order to focus on incorporating aspects of FCMC into appropriate advanced obstetrical care and the appropriate use of technology. The Advanced FCMC Seminar, in the summer of 1998, focused on the core FCMC trainers and other selected providers. Since the visit, there has been consistent data collection for the FCMC monitoring system.

Implementation has varied between the institutions. The Donetsk Regional Center for Mother and Child Care has included a moderate risk group of women for inclusion in FCMC. From September 1997 through March 1998 a total of 188 women have participated. A total of 167 women had a vaginal birth and 21 a cesarean section. The cesarean section rate for this group was 11 percent as compared to the institutional rate of 20 percent. The Odessa Regional Maternity Center has maintained a lower risk criteria for inclusion in FCMC. From September 1997 through June 1998, a total of 164 women participated in FCMC: 159 women had a vaginal birth, 6 a vaginal birth following a previous cesarean, and five a cesarean section. The cesarean section rate for this group was 3 percent as compared to the institutional average rate of 12 to 15 percent. Data collection of the quality assurance FCMC monitoring system continues on a monthly basis through quarterly data reports received by MotherCare.

Other activities and accomplishments include:

- ✦ The official sanitary regulations continue to be a barrier to full implementation in Donetsk. The Donetsk TWG continues to work with the sanitary epidemiologist. The TWG from Donetsk and Odessa continue to campaign for assistance in recommending sanitary regulation policy changes at the Ministry of Health level.
- ✦ The Odessa Regional Maternity Center has trained all staff members in FCMC.
- ✦ Two FCMC rooms have been remodeled through a cooperative community effort. Couples are consistently prepared for FCMC during the antenatal period.
- ✦ A four-hour presentation on FCMC has been developed and presented to surrounding maternity centers.
- ✦ The Odessa FCMC staff and TWG are now providing technical assistance to a local maternity interested in developing FCMC.
- ✦ The TWG continues to meet on a regular basis to review the progress and monitor the clinical results.

Replication

The same plan was replicated in preparation for the second MotherCare sponsored FCMC Training of Trainers (TOT) conducted in Simferopol, Crimea with providers from the Lviv Perinatal Center and the Simferopol Maternity House No. 2. The Lviv and Simferopol TWGs reviewed the TOT curriculum and established benchmarks for quality assurance monitoring. The TOT was conducted in April, 1998 with a multi-disciplinary team which included four midwives, one obstetrician and one neonatologist from each site. The MotherCare trainers included two CNMs and one obstetrician using the collaborative model of doctor-midwife management. Each site will now begin the implementation of their "action plan" to create a model FCMC program.

Conclusions

The MotherCare strategy for planned change in obstetric care in the Ukraine involved an inclusive, multi-disciplinary approach. Formation of a Technical Working Group gave all levels a voice and responsibilities. The TWG has provided continued support for implementation of FCMC. Training a core group of providers using a multi-disciplinary team approach facilitated the dissemination of knowledge and skills and provided the team framework for implementation of FCMC. Essential to influencing providers to change maternity care practices was using an *evidence-based* model of care and *competency-based* clinical training. Building-in a quality assurance monitoring system, agreed upon by the TWG and implemented by the core FCMC trainers, has enabled the institutions and clinicians to document results.

The FCMC MotherCare project had the unique opportunity to build and implement all the necessary components over a three-year period. As the result of the curiosity of one obstetrician, the courage of a young teenager, and the guidance of MotherCare consultants, FCMC has swiftly moved into the hands of dedicated and committed professionals as a sustainable option for women and families in the maternity care services of Ukraine.

Cost Impact of Family-Centered Maternity Care in Ukraine: Positive Clinical Indicators & Cost Efficiency —The Patient Wins

Bradford Else, TEO Resource Managers

Introduction

In order to convince policy-makers and program managers in the Ministry of Health of the potential cost-savings implications of Family-Centered Maternity Care (FCMC), a cost-effectiveness study of the FCMC approach compared with traditional birthing practices was undertaken in Ukraine. The author carried out the "cost study" with Ukraine counterparts in the cities of Odessa and Donetsk over the course of a month in 1998.

Box 2—Research Question

What is the cost impact on the integration of an FCMC approach within the traditional maternity system?

Hypothesis #1: The cost of maternal services in Ukraine will remain the same or decrease by integrating a Family-Centered Maternity Care approach to maternal care in the Ukraine.

Hypothesis #2: The quality will remain the same or improve by integrating a Family-Centered Maternity Care approach to maternal care in the Ukraine.

Null Hypothesis: There is no relationship between Family-Centered Maternity Care and the cost or quality of care.

The central question of the study is: *What is the cost impact of the integration of the FCMC approach into traditional maternal and newborn services?* The three hypotheses used to structure research are stated in Box 2.

In order to conceptualize FCMC cost-management information, a decision tree (see Figure 1, page 8) was designed, linking the cost of inputs with outcomes. The decision tree provides clearer insight into the potential impact of the FCMC approach on costs and quality.

Methodology

As portrayed in the decision tree, the study compared two groups of women. The first group received the FCMC approach while the second did not. The two groups represented the same levels of risk, were large enough so as to represent an adequate sample size to test for significance of the results, and were *randomly selected.* A methodological challenge immediately arose regarding group selection: how to determine that all group members presented a common level of risk. The specific concern was that some women with varying risk levels would pre-select their group. For example, a mother who had a family history of birthing difficulties might pre-select traditional care and not the FCMC approach since traditional care might be more familiar and considered "less risky." Likewise, a mother who had three or four children without complication or incident might pre-select the FCMC approach. This pre- selection process could potentially bias the conclusions since those who chose to receive FCMC would be inherently healthier and would, therefore, incur lower costs and experience higher quality outcomes than the comparison group. To avoid this bias, the study included only women with low-risk births. This approach was deemed to be the most reasonable measure to insure comparability and avoid "pre-selection" risks.

Two sites were involved in the cost study—the Donetsk Regional Center for Mother and Child Care and the Odessa Regional Maternity Hospital. These are the major regional centers for medical care in the Oblast. Each site provided unique contributions to the cost analysis. In one hospital, the implementation path for FCMC was initially more restrictive and directed at a lower-risk patient pool. At the other facility, the FCMC approach was applied to a higher-risk pool of patients, but the implementation paths for integrating the FCMC approach into traditional care were restricted. Ultimately, these differences doubled the costing and analysis effort, but they enhanced the scope and applicability of the conclusions. In the Donetsk sample there were 137 patients and an equivalent control group while in the Odessa group there were 59 patients and an equivalent control group.

To track the relative success of establishing a FCMC approach to care, counterpart institutions maintained key statistics on the frequency of critical components of the FCMC approach (See Box 3).[1] These statistics indicate the relative adherence to a FCMC philosophy by each institution. Therefore the critical components form the underlying basis for the cost study and represent opportunities for cost incidence or cost savings.

Box 3—Critical Components of FCMC

Pre-Birth—Phase #1

- ✦ Ambulation in Labor
- ✦ Enema
- ✦ Perineal shave
- ✦ Fetal monitoring

Birth—Phase #2

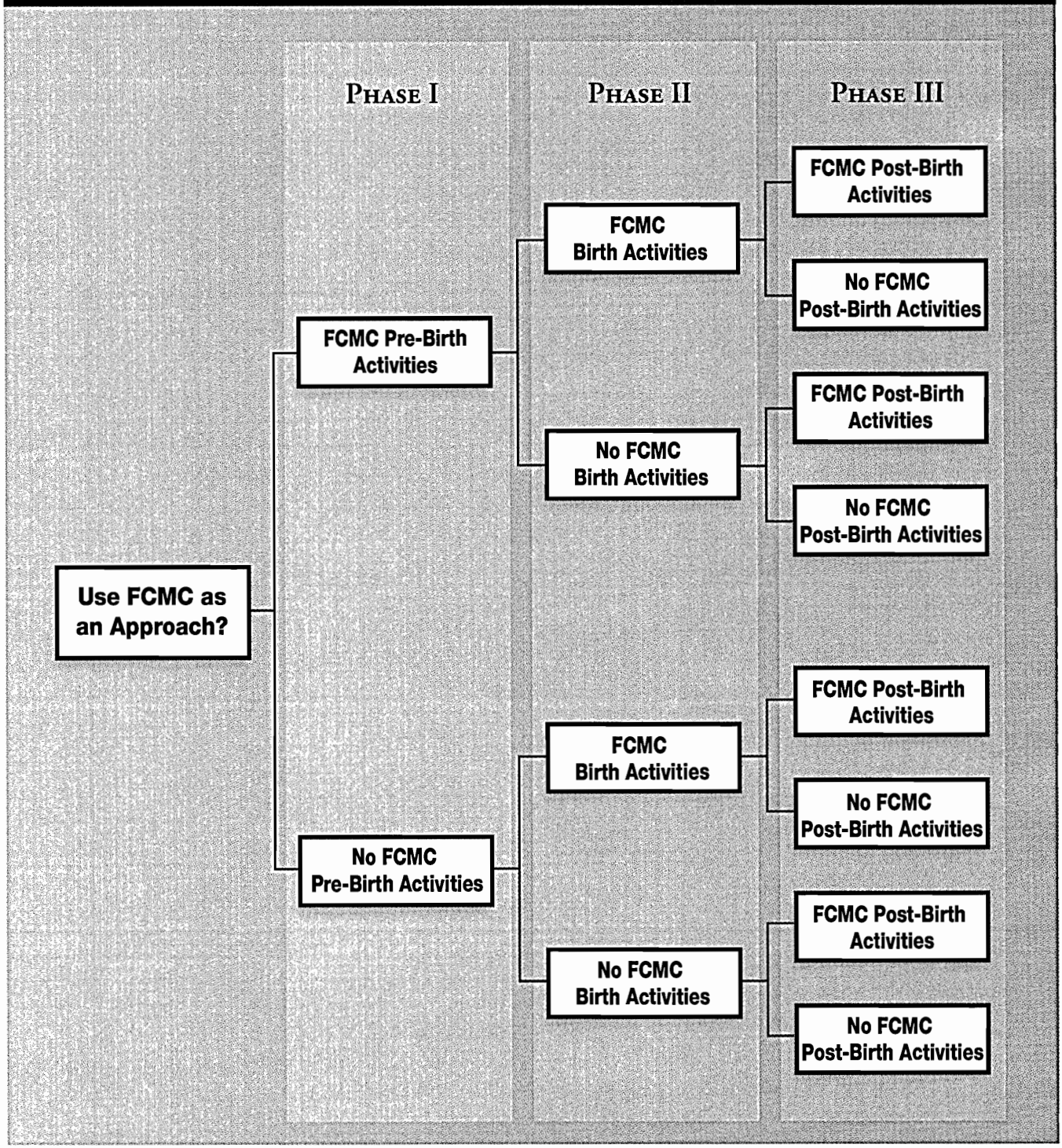
- ✦ Family support during labor
- ✦ Analgesia in labor
- ✦ Anesthesia for labor and delivery
- ✦ Induced labor
- ✦ Episiotomy
- ✦ Cesarean section

Post-Birth—Phase #3

- ✦ Immediate Breastfeeding
- ✦ Baby Rooms with Mother
- ✦ Infections

[1] A special thanks is given to Ms. Polli Glatlieder. Her earlier field work facilitated this cost study.

Figure 1—Decision Tree



There are literally millions of possible combinations of these critical components of FCMC. For example, one woman might have the first component of FCMC and none of the remaining nine; a second woman might have only the second, and so on. By grouping the 13 components into three rational sequential categories (called "phases" in the decision tree) according to the general process of the birth event (See Box 3), the number of variations could be limited to eight possible integration paths. Since the FCMC approach is not an "all-or-nothing" approach, the ability to allow for cultural, social, clinical and patient flexibility in the birth process is a central tenet of the approach. Therefore, it was important for the study to avoid an "all-or-nothing" analysis (e.g. accept or reject FCMC), but rather to provide decision-makers with insight into various degrees of integration and their respective impact on costs and quality. A diagram of these eight integration paths can be seen in the Figure 1, the decision tree for FCMC.

Results

The decision tree allows for a range of labor management possibilities, from a very "pure" FCMC approach to a "purely traditional approach." The estimated cost impact of each path was evaluated. By linking these costs with clinical "outcomes," cost-effectiveness ratios could be calculated. The result: Generally, the "purer" the FCMC approach employed, the greater the cost savings. These results support FCMC, showing a positive relationship between the FCMC path and higher cost-effectiveness.

Integrating the FCMC approach into traditional-care methods decreases costs, with savings ranging from $7.35 to $16.49 (US$) per patient in these sites in Ukraine. At the same time, FCMC demonstrates positive improvements in numerous key clinical indicators (e.g., increased ambulation in labor, decreased enemas and fetal monitoring). The study documents that there is a clear, positive relationship between employing a FCMC approach and the cost and quality of care in Ukraine.

Of particular interest to a decision-maker is the question of exactly who benefits from the cost savings. Given the difficult economic situation in Ukraine, many medical supplies, including drugs, are paid for directly by a patient. Because medical supplies and other equivalent variable costs represent the majority of cost savings due to an FCMC approach, the woman and her family are seen as the primary beneficiary of cost savings.

Summary of Conclusions

- ✦ FCMC makes financial sense.
- ✦ Salary costs are not very relevant; variable costs, such as medicines and supplies, are relevant.
- ✦ Alternative integration paths are important and provide clinical, policy and patient flexibility.
- ✦ Control data are necessary and revealing.
- ✦ Regulatory constraints are seen as primary obstacles to more widespread and rapid acceptance.
- ✦ Patient satisfaction appears unusually high.

Qualitative Research on Pre- and Post-Natal Care in Moldova

Eduard Mihailov and Georgeta Bogush, Opinii Flux

> ***I object to the presence of men at birth...and to the stay of men with their wives in the hospital. I believe men are designed for other things. If he is a real husband, he must keep up the family. And wives are designated by nature to give birth to children and raise them.***
>
> *—a doctor, on the participation of husbands during labor and delivery.*

Background

During July and August 1997, investigators determined the views of health professionals and clients on prenatal care facilities and the quality of service in maternity hospitals in Moldova. Twenty focus group discussions (FGDs) were carried out in four hospitals of the following locales in the Republic of Moldova: the municipalities of Chisinau and Balti, and the towns of Ciadar-Lunga and Orhei. The objectives of the qualitative investigation in Moldova included the following:

- ✦ identify the attitudes and relations between staff and patients in the prenatal institutions during labor, at birth and in the hospital wards;
- ✦ evaluate conditions of prenatal institutions and maternity hospitals;
- ✦ identify the main sources of information for pregnant women;
- ✦ evaluate women's level of preparation for labor and birth;
- ✦ identify attitudes regarding family participation and family-centered maternity care;
- ✦ evaluate attitudes of staff and patients to breastfeeding and rooming-in; and
- ✦ identify the main factors influencing choice and utilization of means of contraception.

Limitations of the data. Over the last decade Moldova has gradually made the transition from a closed society to a more open one; however, there are still some communities in which this transition has been slow and in which individuals are more resistant to taking part in discussions of change. This resistance had to be taken into consideration, as some of the midwives and doctors were distrustful and responded defensively to questions. In addition, because the FGDs were held in the hospitals themselves, some participants felt uncomfortable discussing hospital conditions and were not, therefore, candid in their responses.

Methodology

The investigation team was composed of external collaborators contracted by the Press Group Flux, a research company based in Chisinau, Moldova. In collaboration with Johns Hopkins University/Center for Communication Programs (JHU/CCP), MotherCare subcontracted Flux Group, to train the interviewers in the specifics of qualitative research and, in particular, in FGD facilitation. Interviewers attended a special training course given by the Ukrainian Surveys and Market Research group.

In each of the four hospitals, five FGDs were conducted with the following five categories of interviewees:

- ✦ pregnant women
- ✦ postpartum women in the maternity hospitals (at the third to fifth day after birth)
- ✦ husbands of postpartum women
- ✦ doctors involved in the assistance at birth and postpartum care
- ✦ midwives involved in the assistance at birth and postpartum care

To recruit interviewees, the investigation team used screening questionnaires. A total of 154 people took part in the FGDs, with the number of people per group varying from 6 to 9. Discussions, which lasted between one to two hours, were conducted in Romanian and Russian, tape recorded and then transcribed.

Results

Prenatal Care

Attitude of medical staff toward patients as reported by female patients. The majority of the women expressed dissatisfaction with the quality of care in the prenatal institutions, pointing out that the attitude of staff was too formal. *You just come to the examinations, they measure you, measure your weight; they only do their duty. They would explain nothing to you, only: 'come again next time' and that's all.*

Preparation for labor and birth during the prenatal period. Most pregnant and postpartum women said that during pregnancy they receive very little information about birth, breastfeeding and family planning. As one woman said, *'All I was told is not to scream and behave myself.'* The couples were not adequately prepared for the birth process. In fact, both women and men expressed an interest in receiving more information about newborn care, including feeding, and the process of labor and delivery.

Care at Labor and Birth

Maternity hospital conditions. In all 20 FGDs, participants concurred that the entire system of health care in Moldova is in financial crisis. Maternity hospital working conditions are poor, equipment and supplies are in short supply, and salaries are low and not paid on time. Despite these criticisms, most of the women and men would recommend the maternity which services them; however, one husband explained, *I believe it is better here because I have nothing to compare it to.*

Decision-making. Most patients believe that the main role in decision-making should be played by the doctor and the midwife. Yet some said that during labor women know better which is the most comfortable way and that they should decide which position to take in order to alleviate pain. Although the majority of the doctors and midwives felt that only they were capable of deciding the birthing position, several patients believed that they should choose their birthing position.

> ***We have no information about the other positions, but if there were something better, we would accept it.***
>
> *—a woman, on making a decision about position of birth*

Preparation for labor and delivery. Most women claimed they felt unprepared for labor and birth. One woman had to rely on family for information. *I asked my mother how I would know when the contractions start.* And she told me, *'you will understand that when you start scratching the walls.*

Family-Centered Maternity Care

Participation of husbands. Most medical staff objected to the participation of the husband and relatives during the postpartum period because of bad conditions in the maternity hospitals, shortage of staff, and poor behavior by the relatives. As one midwife explained, *Our men just don't know how to behave at birth. If the husband cooperated with the midwife, this would be wonderful, but it happens that [the men] interfere.* Yet some staff members thought that if a woman had a complication and needed more complex care, she could be assisted by one of her relatives.

In some maternity hospitals, patients are not able to communicate with their relatives, except by transmitting a message through the medical staff or shouting through the window. Nearly

half of the interviewees thought there should be a special room where women could meet their relatives. As one husband commented, *They'd better equip a room where they would allow us to talk to our wives....I am ready to get completely sterilized [i.e. germ-free], let them put [me] into a shower, but let them take me to my baby, for me to see it.*

> ***There was such a case here: one husband stayed with his wife when she delivered. He wept all the way during birth and finally he said, 'I wish all the men saw how difficult it is to deliver, and I think of how we sometimes treat our wives. They give birth to our children, and we mistreat them.' The husbands should be there by all means.***
>
> *—a midwife, commenting on joint childbirth*

Another husband noted that, *...it should be like this— you come to your wife, you pay the money and stay there as long as you want. But they wouldn't let us; they limit the time to 20 minutes. What if I don't even manage to talk enough to my wife in 20 minutes?*

All doctors and midwives believe that the attitude of the family toward a woman plays a significant role in the normal development of the pregnancy and birth and during lactation. A pregnant woman should be surrounded with attention and love and assisted by her relatives. However, the majority of medical staff suggested that this care should only be provided when the woman is at home, rather than at the hospital. Staff members explained that, at this time, conditions are inadequate for relatives to take part in the process of childbirth and postpartum care. On the other hand, some doctors and midwives noted that women seemed calmer when they had relatives with them, and that doctors feel more responsible and are more attentive if a relative is present.

> ***You are calmer when you have your baby with you.***
>
> *—a postpartum woman, on rooming-in*

In order to successfully implement the practice of husbands attending labor and delivery, the majority of doctors and midwives suggested preparing the husbands by providing information to them and giving them a medical examination before they enter the delivery room.

Postpartum Period

Rooming-in. Most of the doctors and midwives believe that it is a positive experience for the child to be with the mother during the postpartum period. *It is perfect for a child when he feels his mother— there is a skin-to-skin contact...this is very good. The biological contact...which had started inside the mother, is continued.* Most of the doctors and midwives also agreed that the babies should be given to the mothers to be held and breastfed immediately after delivery. *It is good...we have been doing the contrary for many years and now we are sorry. Now we see this is a necessity and a very good thing*

All women interviewed stated that, in the absence of complications, the baby should stay in a ward with her/his mother. Yet the majority thought babies and mothers should room together on the condition that there is one or at most two postpartum women in a ward, as opposed to the present situation in which there are two to six women in a ward.

Breastfeeding. All the women interviewed believed that if the baby is breastfed for a longer time, s/he is healthier and develops better both physically and mentally. They consider mothers' milk to contain all the substances needed for the development of the child. Moreover, the women noted that formulas are expensive whereas mothers' milk is free and needs no preparation; it is warm and fresh anytime.

Recommendations

As a result of the investigation, the Moldova research team prepared a list of recommendations to reorganize pre- and post-natal systems:

Encourage systemic reformation. Wherever possible, the same doctor should consult with the woman during the prenatal period, at birth and during the postpartum period.

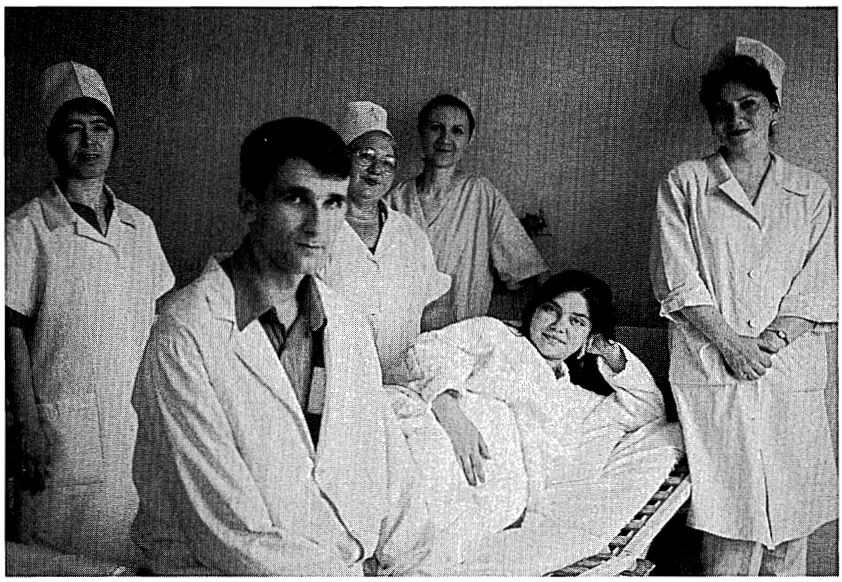
Implement changes in maternity hospitals. Couples should be able to choose whether the husband/partner is present at birth; special training should be organized for the men who choose to be present. If women are unable to stay in one ward, there should be special rooms where patients can meet their relatives.

Disseminate information at prenatal institutions. Both women and men should be informed on such issues as contraception, sexually transmitted diseases (STDs), care during pregnancy, hygiene, breastfeeding, care of the newborn, child development, and education. Medical staff should receive training on contraceptives, especially with regard to the lactational amenorrhea method (LAM) and on positions at birth. Prenatal institutions should formally institute such information and education practices.

MotherCare translated these findings and recommendations into training needs and incorporated them into the Family-Centered Maternity Care training curriculum for the midwives and physicians training-of-trainers (TOT) course.

Introducing Family-Centered Maternity Care in Moldova

By Judith S. Mercer, C.N.M, DNSc, FACNM



Anna awoke early Sunday morning with contractions. She was excited that she would soon see her baby, yet fearful because she knew that she would be facing labor alone. As was typical in Moldova, she would have to leave her husband Peter at the door of the maternity and would not see him again until several days after the birth.

The couple had read everything they could find on childbirth and had hoped to find money to go to a hospital in Russia where Peter could be with Anna during labor and birth. But the trip had been impossible. Oh, how she wished that he could be there to offer her support during her pain and share her joy when the baby came!

When Anna and Peter arrived at the maternity, they were greeted by a midwife and doctor who told them about a special program in Family-Centered Maternity Care (FCMC) which encourages the father or relative to stay with the woman in labor. The staff said that this was the first day of the program, and there were two American midwives and an Italian doctor training Moldovan physicians and midwives in FCMC practices. Anna and Peter were overjoyed to participate and felt that their prayers had been answered. As a result, Anna and her husband received the attention and support they had hoped for during her labor and delivery. At the end of a long day, Anna gave birth to a healthy, eight-pound baby girl, whose father helped welcome her!

Anna, Peter and little Lucy were the first family to participate in the family-centered maternity care services offered in Moldova in November 1997. These services are now available because training was given to multi-disciplinary teams composed of doctors, midwives, and neonatologists from four maternities—Balti, Orhei, Ciadar-Lunga, and Chisinau, (the Refresher Training Center for doctors, midwives and epidemiologists). By June 1998, all four of the participating maternities[1] were welcoming fathers or family members as support persons for women in labor. What made the difference?

Background

The maternal mortality ratio in Moldova is four times that of Western Europe (40.2 maternal deaths per 100,000 live births in Moldova as compared to 10 per 100,000 in Europe), and the infant mortality rate is three times higher (15.2 per 1000 in Moldova versus 5 per 1000 in Western Europe).[2] Health care is provided solely through the government. This system functioned under the Soviet rule without any input from communities regarding design of or satisfaction with services. As a result, maternity care has been doctor-centered rather than woman or family-centered. A woman is expected to labor and deliver without support from her family, and typically, she does not see her husband and family until five days after delivery, when she leaves the hospital. Labor rooms are large, usually accommodating six beds, and there are typically two beds in the delivery rooms. Hence, women have very little privacy. Following an assessment of maternal services, it was recommended that the Ministry of Health begin the introduction of the FCMC approach to maternal and neonatal intrapartum services. Because the country has been isolated from the medical advances made in the West over the last 40 years, one of the most serious deficits voiced by all practitioners in the training sessions is the lack of current medical information translated into the Russian language.

Methods

A Technical Working Group (TWG), with representatives from each of the four maternities, was established and a Training of Trainers (TOT) curriculum for the multi-disciplined provider team was adapted from the Ukraine curriculum for use in Moldova (see Section 1).

The FCMC curriculum begins with an overview of the FCMC approach, including key articles used to validate and provide the rationale for evidence-based practice. Prior to the training in the four sites, focus group discussions with women and men collected opinions about their perceptions of prenatal and delivery care in Moldova. Data from this study were used in the training course. The training included a week each of theory and clinical competency, focusing on a physician-midwife team approach to providing labor and delivery services, a concept heretofore untested in Moldova. Through collaboration with WHO/Trieste, the FCMC

[1] In Moldova, the centers where MotherCare worked were all maternities (not maternal child health centers, etc.); Some may be attached to hospitals but the MotherCare focus is in the maternity centers.

[2] The national plan to reduce the maternal mortality ratio to 20 per 10,000 by the year 2003 and the IMR to 12 per 1,000 by year 2003

trainers also attended a neonatal course prior to the beginning of the FCMC course. The 23 graduates of these courses will be responsible for establishing demonstration sites at their maternities and conducting future trainings. UNICEF will support future trainings as part of Moldova's five-year plan to improve maternal and perinatal services. The national plan is to reduce the maternal mortality ratio to 20 per 100,000 by the year 2003 and the IMR to 12 per 1,000 by year 2003.

Results

Pre- and post-test results show a major shift in knowledge about FCMC practices and puerperal sepsis. Evaluation of the didactic and clinical weeks was very positive. Many participants stated that they liked how the consultants spoke to and treated the women. One neonatologist liked the interdisciplinary team discussions of the cases and planned to hold more of them in Moldova. They spoke of the happiness on the faces of the women cared for by the TOT group. One of the physicians stated that she learned to value the midwives more and would work better with them in the future to achieve more FCMC at her institution.

The major accomplishment of the FCMC TOT was the creation of a core group of Moldovan trainers, who have been very active since their training accomplishing the following:

- ✦ The trainers have established demonstration models for FCMC by implementing FCMC at each of the four training site.
- ✦ All sites have established benchmarks for performance as part of their monitoring system.
- ✦ All sites have made provisions for family members to attend labor and birth; most sites are allowing postpartum visits by family members.
- ✦ Three out of four sites are providing private labor and birth rooms for the women with family members.
- ✦ All sites are offering some form of training classes to prepare women and their partners for birthing.
- ✦ There has been an increase in birth practices now considered "normal" in the West, such as ambulation in labor, and a decline of invasive and ineffective practices, such as enema and shaving.
- ✦ Orhei Maternity, with the support of UNICEF and the team implementing the five-year plan, has begun training in FCMC for the maternity care providers in the central region; Balti (in the north) and Ciadir-Lunga (in the south) will begin training in their regions in November.
- ✦ Training of interdisciplinary teams (doctors and midwives working together) is being implemented.
- ✦ The concept of evidence-based practice has been introduced, and current scientific information has been translated and made available.
- ✦ All sites are routinely using the WHO partograph when appropriate, and two sites have the midwives as well as physicians recording on it.

The trainers report that women seem happier and more relaxed and comfortable with family members present for support. One physician said that her staff are stimulating half the number of labors since the introduction of the partograph. Most importantly, this program appears to be fully sustainable because of the commitment of the Moldovan trainers; the support, assistance, and encouragement from the Ministry of Health and UNICEF; and the support and active participation of couples, such as Anna and Peter, in the birthing process.

Clients' Perception of Reproductive Health Services in Vladivostok and Novosibirsk, Russia

Working Paper, SEATS[1] and MotherCare with Department of Public Health, Novosibirsk Oblast, and Department of Health Services, Primorsky Krai, Russia

Introduction

Primorsky Krai, located in Russia's Far East, and Novosibirsk Oblast, situated in Western Siberia in the geographical center of Russia, are two administrative divisions of the Russian Federation with similar reproductive health indicators. Although small family size is the norm, the contraceptive prevalence rate (CPR) is low. Women and service providers have become accustomed to using repeat abortion to control fertility. In fact, it has been estimated that up to 80 percent of Russian women of reproductive age rely on abortions as their method to control unwanted pregnancies. The average Russian woman has 5 to 8 abortions in her lifetime.

A substantial portion of the maternal mortality and morbidity in Russia is attributed to repeat abortions. One of the principal causes for this habitual behavior has been the lack of contraception options and contraceptive commodities. In response to this situation, SEATS and MotherCare were requested to programmatically address the high levels of maternal mortality and morbidity—particularly the problems associated with abortions—by increasing the knowledge, availability and use of contraceptives. The SEATS project provided the contraceptive technology training courses, and MotherCare complemented these efforts with education and promotion of the Lactation Amenorrhea Method (LAM) as a contraceptive option for the immediate postpartum period. However, for LAM practices to be successful, MotherCare also had to address barriers to correct breast-feeding management (early and exclusive breast-feeding), including the option to all women of 'rooming-in,' still an uncommon practice throughout the Russian Federation.

> ***The conditions in the maternity clinic are impossible. There is no hot water, nothing...to the point that when I came in to have a baby, they told me, 'Hold up your shirt, so it won't get wet, because there's nothing to change into.' And when I had given birth, and I asked them to put the baby on my stomach, they said to me, 'Then how will you wash yourself?' and didn't give it to me.***
>
> *—woman served in a maternity in Vladivostok*

SEATS and MotherCare provided this technical support in Primorsky Krai/Vladivostok and Novosibirsk Oblast. As in Ukraine and Moldova, the Family-Centered Maternity Care approach was applied, giving women and their partners current contraceptive information and counseling with respect to contraceptive options, including LAM. Rooming-in was also presented as optional for all women. Given the need to hear the voices of women and men about their perceptions of the reproductive health system in Russia, SEATS and MotherCare supported a qualitative study to capture these perceptions. This article highlights the major findings of the study.

[1]SEATS- Family Planning Service Expansion and Technical Support is a USAID project dedicated to expanding the development of, access to, and use of quality family planning and reproductive health services in currently undeserved populations.

Methodology

To strengthen the reproductive health services with a client-oriented focus, SEATS and MotherCare supported a qualitative study in both oblasts in order to capture the perception of women and their partners' of the quality of reproductive health services in Primorsky Krai and Novosibirsk. Women who used women's consultative services, postpartum women, and husbands of postpartum women participated in the focus group discussions (FGDs). The intent was to use these data to inform the training course content.

Conducted in April 1996, each of the four discussion groups met for about two hours. Questions they were asked related to general impressions and satisfaction with clinical services, experience with breast-feeding and contraception, and sources of information on maternity care, breast-feeding and contraception.

Findings

Women's Consultations & Maternity Clinics

This study confirmed that the women in both cities typically receive prenatal care and other women's health care at women's consultations (outpatient clinics). For delivery, the women are referred to maternity clinics/hospitals. However, maternity clinics do not offer contraceptive services, so clients are referred back to their local women's consultation for these services. The women's consultations appear to be easily accessed by the clients.

Women visit the women's consultations for a variety of services including:

- ✦ gynecology
- ✦ family planning
- ✦ prenatal care
- ✦ mini-abortions
- ✦ immunization (occasionally)

Because of the way the medical personnel treat them, most women attend the clinics only 'as needed' . One woman's characterization of a visit follows: *My attitude toward gynecology always involves a certain kind of stress. It takes me a week to make up my mind that I have to go. I always feel trapped in the office. Most often, someone will drop in on the doctor...and [he] will say, 'Just stay there, I'll be right back.' I can't always be sure that no one will bother me. I can't feel free and easy in my mind.*

Another woman expresses the following frustration: *I went to have tests. At first, I couldn't understand for a long time how they wanted me to sit. They said to me in a loud voice, 'Sit in this position,!' I was sitting there thinking, how [one] could sit like that. She [the nurse] just threw my legs around. It was unpleasant, not painful, but...Then she started to stick me, and I said, 'Excuse me, but isn't there something for the pain?' She shouted at me: 'So young, and already almost a whore.' I went away with tears in my eyes. They [other patients] told me, 'Be patient, the nurse here is like that.' I refuse to go there again.*

Negative perceptions of these visits are common reasons given for avoiding gynecological examinations for pregnancy, contraception, possible infection, or just routine check-ups. However, not all women have negative feelings about their women's consultations. Many have actually found that by shopping around they are able to find a doctor they are comfortable with. One participant stated: *...I found a good doctor...I know that this doctor won't give me some kind of infection. I feel all right.* Some clinics, because they are organized by neighborhood, do not offer the opportunity to choose your own doctor. One client gives her feelings on choice:

> *Each person needs [her] personal doctor, who always takes care of [her], and whom [she] likes. And if I don't like my doctor? I would like to have the choice of a specific doctor, whom I trust, who knows all your problems, and whom you don't have to tell [your personal medical history] to ten times.*

The perceptions of these visits, positive or negative, play a key role in the reasons for participants to seek or not to seek reproductive health services before, during, and after pregnancy.

Contraceptive Knowledge

Although they believed themselves to be highly informed about contraception, men and women gave responses indicating otherwise. Their responses showed inaccurate perceptions about oral contraceptives, LAM, and periodic abstinence. Fear of hormonal methods was also noted. The inconvenience of the pill was a strong deterrent for some respondents. *The pills have to go everywhere with you. You always have to have them with you; you can't forget to take them.* Any method other than the IUD received negative attention from physicians. One quote from the FGD stated the following: *Oncologists say that disrupting the hormonal background is undesirable. We know of a gynecologist-oncologist who does not recommend hormone tablets for young people-or for anyone. That doctor recommends the coil, and only the coil* (coil presumably means an IUD). Condom use was generally considered safe, reliable, and easily accessible. *They are easy, trustworthy, reliable, and finally, they sell them at any kiosk.*

Abortion is habitually used in both areas, and the respondents indicated that a lack of options and knowledge about the harmful effects of multiple abortions were the reasons for repeat use of abortion as contraception. Because abortions are performed at no cost, they are sometimes considered the best alternative, and as one participant put it, *...it is one hundred percent [effective].* Most participants stated that they received the majority of their information on contraception from a relative, friends, a medical professional, or literature.

Breast-feeding

Breast-feeding education practices reported in the FGDs were quite different for each city in the Russian study. In Vladivostok, breast-feeding education was not a systematic process, but women were helped with questions on an as-needed basis. On the other hand, most breast-feeding education in Novosibirsk was done after childbirth, and it was often part of a routine examination by the obstetrician. Women in both study groups expressed positive attitudes toward breast-feeding for the sake of the infant's health (see Box 4). Most felt breast milk to be the best food for infants as evidenced by the following quote: *I don't think anything can replace breast milk. It's a unique food; there's nothing like it. There are no substitutes for it, not baby food or formula.*

Although most men and women strongly felt that breast-feeding was the best for the infant, many women did not want to breast-feed, so as to not spoil their breasts. Others, could not breast-feed due to lack of time. Yet, women and men preferred breast-feeding to supplementary feeding. Although most of the partici-

Box 4—FGD Results on Breastfeeding in Vladivostok & Novosibirsk

Reasons for breastfeeding mentioned by both men and women

- it is natural
- allows mother and child to bond
- breast milk is irreplaceable
- the infant needs the colostrum
- it is sterile
- it is easier
- cheaper
- helps the uterus contract
- passes on immunities

Reasons for not breastfeeding mentioned by both men and women

- physical appearance
- to keep breasts beautiful
- not enough time
- forced to return to work
- not enough milk

pants had positive attitudes toward breast-feeding, many lacked firm plans and accurate knowledge so that in many cases the parents were unable to follow-through on their good intentions to breast-feed.

Lactational Ammenorrhea Method

Lactational Amenorrhea Method (LAM) is a concept with which most participants were familiar (See Box 5). The LAM approach is based on the fact that breast-feeding provides some natural protection against pregnancy. This method was perceived to be unreliable by some participants, causing a lack of confidence in its use. One woman describes her fear of LAM as follows: *It's the most frightening thing that you have no menstrual periods, and you think everything is all right, but it could be pregnancy already.* Still others received confusing and incorrect information about LAM—

> *I heard a lecture about contraception. ...natural protection during breast-feeding.*

> *I understood it this way: you count four hours from the period of breast-feeding; the closer to the four-hour mark (the end of the period), the greater the chance of getting pregnant. If I have sex immediately after nursing, it will be a natural barrier to conceiving a child. But later, they still recommend that you take artificial precautions... if I'm not mistaken.*

Thus, while participants were familiar with the LAM method, in general, there was considerable confusion about the details.

Maternity Clinics

Generally, women attended the maternity clinics associated with the consultation site where they sought prenatal care. Others chose maternity clinics based on familiarity with the clinic from previous experiences. Participants often felt that the maternity clinics lacked important information on various topics ranging from newborn care, self-care, nutrition of both the child and the mother, contraception, and other medical concerns such as anesthesia, retained placenta, and other postpartum conditions. Nevertheless, the general impression of the maternity clinic was positive: *I was lying there [in the maternity section] alone; the midwife sat on the bed next to me. There was moral support, and I felt calm. All the doctors were near me.* Those who had the worst impressions were the men: *I called from Korol to find out about how she was, because we hadn't seen each other in a long time. They were rather rude. They hang up the phone in a hurry. 'You want to know whether she's had the baby yet.' 'No,' and that's all. Their attitude is offensive.*

The sanitary conditions were also seen in a poor light, *I have an awful impression from the washing. They wake you up at five in the morning and five in the evening. A line forms. You wash twice a day, with it running off you in a*

Box 5—The Lactational Amenorrhea Method (LAM)

A woman is 98 % protected against pregnancy if she fulfills all of the following three criteria:

1. **Menses have not yet returned**

   spotting or bleeding during the first 56 days postpartum is not considered a menstrual bleed

2. **Infant is fully or nearly fully breastfeeding**

3. **Infant is less than 6 months of age**

   Intervals between breastfeedings should not exceed four hours during the day, or six hours at night. Supplemental foods and liquids should not replace a breastfeeding.

When any one of the 3 criteria changes, the woman should immediately start using a complementary Family Planning method for continued protection.

Lactational Amenorrhea Method (LAM) Self Study Module, Farrell, Scanlan, Coly, Armbruster, 1996

stream, especially the first two or three days. Everyone stands in line to wash. It's a terrible feeling.

Joint Childbirth & Rooming-In

Although the practice is not currently encouraged, and in some facilities not allowed, postpartum mothers and fathers favored the idea of joint childbirth (the father being present during birthing process). They viewed the experience as a chance to strengthen their relationship. One woman expressed it this way: *People I know have gone through it together. The husband trembles over his little daughter, and everything is fine with them. When we have a second child, we will do it together.* A father expressed his interest saying, *I believe that the father should be present at the birth. As the person closest to his wife, he should help matters somehow at a difficult moment. I think it's a good idea.* However, the fathers do not always feel they are ready for such an experience—some made statements such as, *I think it's strictly a woman's affair.* Rooming-in was also favored by both men and women participants, that it established a closer bond between the mother and child. *A bond develops between mother and child. It's important not to waste the first few days.* On the other hand, mothers sometimes felt they had to rest after childbirth. Or they were afraid because they did not feel equipped to handle and care for the infant. The majority of participants' feeling toward rooming-in is summed up in one participant's opinion, *No one will take care of the baby like the mother.*

Recommendations

Participants in the FGDs described many instances of disrespectful treatment by service providers. Discourteous and brusque behavior and failure to respect clients' privacy were routine complaints. Although the clients had some information about LAM, STIs, contraceptive choices, joint childbirth, the positive effects of breast-feeding and the harmfulness of repeat abortions, they were not fully informed and, at times, were misinformed. Furthermore, despite some knowledge of these key health issues, the clients did not feel empowered to request the services they wanted and needed. In response to the issues raised in the FGDs, the following recommendations were developed:

- ✦ Service providers, program managers, trainers and policy-makers should be sensitized to the expectations and rights of all clients, regardless of age. The findings of these FGDs should be shared with these various service providers involved in reproductive health, and their suggestions for feasible actions to foster a client orientation should be sought and implemented.
- ✦ Service providers, their trainers, and program managers should receive formal training and organizational support to implement the client-centered approach.
- ✦ Clients and their spouses should be given accurate, thorough and clear information on all aspects of reproductive health and be encouraged by service providers to play an active role in decisions.
- ✦ Maternity clinics should offer couples the option of joint childbirth. Information on pregnancy, labor, and delivery should be made available to fathers and fathers-to-be; husbands should be allowed to visit their wives.
- ✦ Accurate, step-by-step information on breast-feeding should be offered to women and their partners during the prenatal period, while in the maternity clinics, and at postpartum follow- up visits.
- ✦ The link between successful breast-feeding and rooming-in should be a key message for clients and providers. Maternity clinics should facilitate rooming-in of newborns.

Conclusions

Not only did the research detailed in this report provide important information on the design and implementation of specific project activities and on the importance of a client-oriented approach, but by modeling the client-oriented approach in its execution, the research also introduced a new and useful methodology to the policy-makers, service providers, and trainers of Novosibirsk Oblast and Primorsky Krai.

The introduction of the client-oriented approach (soliciting client perspectives through focus groups) and the enhancement of providers' clinical and counseling skills in reproductive health have paved the way for a series of policy changes. These important changes initiated by the Russians continue to enhance the provision of client counseling and respect for client rights in reproductive health decision-making. Through the cooperative efforts of all the players involved in this detailed work, the women and families of Primorsky Krai and Novosibirsk Oblast enjoy higher-quality reproductive health care at every level. Continued attention to client needs, training and information dissemination will allow new standards to be set and more candid and productive dialogues to take place on the issue of quality maternity and reproductive health care.

COMMENTARY

Historically, the maternity service delivery models in Ukraine, Moldova and Russia have adhered to a medical model, with minimal focus on meeting the cultural and emotional needs of a woman and her family during labor and delivery. Typically, women labor alone without family members are not allowed to ambulate during labor, nor are they given fluids. Routine procedures include perineal shaving, enemas and episiotomies. Husbands and families are generally not allowed to visit women immediately postpartum and are made to wait outside the hospital, waving at the woman and baby at the window.

The introduction of the Family-Centered Maternity Care approach with training in Ukraine and Moldova has resulted in changes in policies and practices that have become apparent in a very short time. After only one year of support, Odessa established a separate FCMC unit, giving women more options for the birthing experience. All of the maternity training sites are showing progress according to benchmarks established to monitor their progress in implementing FCMC practices. Both Donetsk and Odessa have shown significant reductions in use of routine enemas, perineal shaving, and use of analgesia. Induction of labor was reduced in both centers. Donetsk also showed significant reduction in the use of c-sections among FCMC clients. In Moldova, three out of the four training sites are providing private labor and birthing rooms for women and family members. All four sites have made provisions for family members to attend labor and delivery, with most sites allowing postpartum visits by family members. All sites are routinely using the WHO partograph, when appropriate; two have midwives as well as physicians recording the progress of labor on the partograph. The cost-effectiveness study in Ukraine shows that FCMC makes financial sense: After the integration of FCMC practices within a traditional birthing setting, not only was there an increase in client and family satisfaction, there was a decrease in cost.

Policy changes in reproductive health also occurred in Russia: contraceptive choice, the adoption of updated reproductive health curricula in training institutes and breast-feeding management and rooming-in options, are all made available in maternities in Primorsky Krai and Novosibirsk.

The consistent use of the same consultants in each country enabled confidence and open dialogue between the U.S. and European consultants and the NIS administrators and providers. The joint effort and commitment of the Moldovan, Ukrainian and Russian policymakers, produced and continues to produce services welcomed by women and their families, provides greater job satisfaction for providers, and offers cost-effective maternity care options for women and their families.

A Celebration of Life

Bonnie Pedersen 1943-1998

We are profoundly saddened to announce that Bonnie Pedersen, CNM, MPH, died from complications of a ruptured cerebral aneurysm on June 13, 1998. She was the Deputy Director of USAID's Office of Population, Services Division, an ardent supporter of midwifery, the founder of the Special Projects Section at the American College of Nurse-Midwives (ACNM) and a true advocate for women and children around the world.

Advocate for Women and Children

Bonnie's life was committed to serving the women and children of the world, particularly those in most need. Her long history of public service began with public health nursing in Alaska, Hawaii, Georgia, Michigan, and New York City. It was during this time that Bonnie recognized the significant impact that family planning could have on the ability of women to improve their lives, and she subsequently devoted herself to programs which would make family planning and, later, integrated reproductive services, available to women. She obtained her nurse-midwifery degree at Downstate Medical Center, State University of New York and joined Downstate's faculty in 1976. Bonnie was a clinical instructor, a clinician and instructor in their international family planning training program from 1976 to 1980.

Pioneer and Visionary

In 1982, with the approval of the ACNM Board of Directors, Bonnie initiated the Traditional Birth Attendant (TBA) Training Project, which received USAID funding through INTRAH. In 1984, the TBA Training Project became the Special Projects Section, with a vision of both international and domestic projects. Under Bonnie's leadership, the ACNM became internationally recognized for its work with TBAs, as well as its work in family planning, with international midwifery associations and in the development of the Life-Saving Skills training program. Bonnie truly believed that midwives had a significant and critical role to play in improving the health and well-being of women and children internationally and that ACNM, with its Special Projects Section, could and would play a leadership role in the international arena.

Going Global

In 1989, Bonnie joined the United States Agency for International Development in the Office of Population. USAID states, "Bonnie has provided outstanding leadership in USAID's worldwide population assistance program, serving in the Office of Population's Communication, Management and Training Division and as Deputy Chief of the Family Planning Services Division. From her work in the last decade with USAID, Bonnie leaves an enormous legacy of policy and programmatic innovation — in advancing reproductive health and the rights of women in developing countries; strengthening the technical competence of family planning service providers; charting new directions in the provision of quality family planning and reproductive health services; and playing a key role in the design and management of the FOCUS on Young Adults program."

A Passion for Life

Bonnie was truly a role model for all of us. She was both a gifted and dedicated professional, whose hard work made a difference in the lives of others and a woman whose zest for life was apparent everyday. From playing the cello, practicing yoga, attending cultural events, and participating in book clubs to hosting international and national guests, Bonnie did not let a moment go unnoticed and unappreciated. She traveled the Amazon River, bicycled in the mountains, paddled the canals of Wales and camped in Montana. Her family was very important to her and an integral part of her life.

Her warmth and humor were contagious, her vision and candor made us look again at our priorities, and her compassion and dedication made us glad she was part of our team. Bonnie touched the lives of so many people... and we are the richer for it. It is only unfortunate that she left so soon. We will miss her in a most profound way.

Bonnie's family has asked that contributions in memory of Bonnie be made to the ACNM Foundation in her name.

Deborah Armbruster, CNM, MPH
Director, Special Projects Sections, ACNM

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