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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 puskesmas (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 puskesmas 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 puskesmas 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

Outcome	Intervention	Control
	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

Outcome	Intervention		Control	
	Gabus Wetan		Sliyeg	
	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:

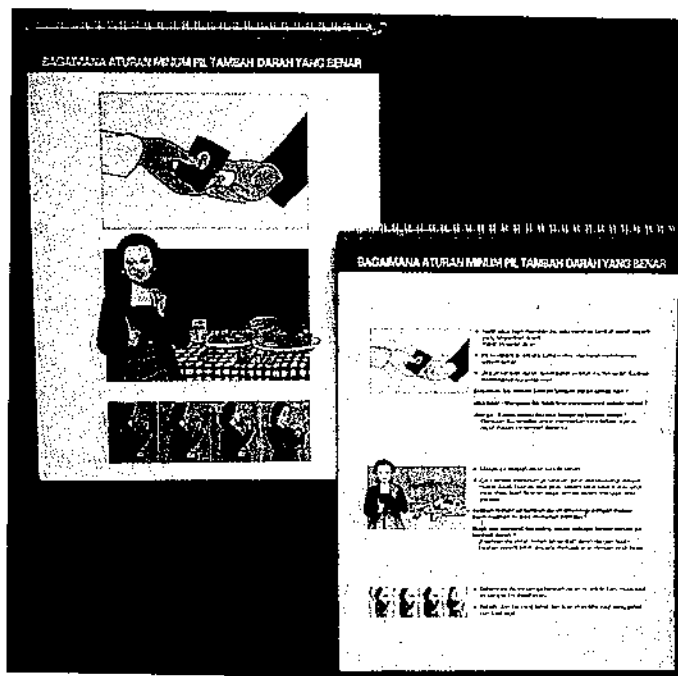
- All campaign materials featured Ibu Sehat, a healthy pregnant woman who takes iron-folate tablets each day. Women recognized and responded positively to this symbol of the campaign. Messages also included instructions on iron-folate tablet use, management of side effects, and supply sources, including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