

# Symposium: Improving Adolescent Iron Status before Childbearing

## Reaching Young Indonesian Women through Marriage Registries: An Innovative Approach for Anemia Control<sup>1,2</sup>

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**ABSTRACT** In an effort to build iron stores before pregnancy and reduce the high prevalence of anemia in Indonesia, the Ministry of Health/Indonesia and the MotherCare project implemented an anemia control program for newly wed women. As part of an existing program to counsel couples about marriage and require them to obtain tetanus toxoid immunization before obtaining a marriage certificate, women also were counseled to buy and take 30–60 iron-folate (IFA) tablets. Women ( $n = 344$ ) were enrolled from one of three participating districts in South Kalimantan, Indonesia. At first monitoring, at least 30 d after baseline, 261 women were tested for hemoglobin and asked about their IFA tablet consumption and knowledge of information, education, and communications (IEC) materials promoted through the program. Results showed that there was a decrease in the prevalence of anemia from 23.8 to 14.0% over the course of the program, 98% of women had taken at least some IFA tablets and 56% had taken >30 tablets. *J. Nutr.* 130: 456S–458S, 2000.

**KEY WORDS:** • anemia • women • iron supplementation

Nutritional anemia is one of the most prevalent malnutrition problems in Indonesia. Studies have found more than one half of pregnant women in the country are suffering from nutritional anemia (Demographic and Health Survey 1991). Aware of the magnitude and consequences of this problem, the Ministry of Health (MOH)<sup>4</sup> has made the anemia control program for pregnant women a priority (MOH 1993). The main program to decrease the prevalence of anemia during the last decade is provision of no cost iron-folate (IFA) tablets (60 mg elemental iron and 0.25 mg folic acid) to ~60% of pregnant women throughout the country via health providers and facilities.

<sup>1</sup> Presented at the symposium entitled "Improving Adolescent Iron Status before Childbearing" as part of the Experimental Biology 99 meeting held April 17–21 in Washington, DC. This symposium was sponsored by the American Society for Nutritional Sciences and was supported in part by an educational grant from Micronutrient Initiative, Ottawa, Canada. The proceedings of this symposium are published as a supplement to *The Journal of Nutrition*. Guest editors for the symposium publication were Kathleen Kurz, International Center for Research on Women and Rae Galloway, World Bank/Micronutrient Initiative.

This publication was made possible through support provided by the Office of Health and Nutrition, USAID, under terms of contract no. HRN-Q-05-93-00039-00, and the MotherCare Project, John Snow, Incorporated (JSI), and in cooperation with the Ministry of Health, Government of Indonesia. The contents and opinions expressed herein are those of the authors and do not necessarily reflect the views of USAID or JSI.

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<sup>4</sup> Abbreviations used: Hb, hemoglobin; IEC, information, education and communications; IFA, iron-folate; MOH, Ministry of Health; MOR, Ministry of Religious Affairs; MUAC, midupper-arm circumference; TT, tetanus toxoid.

The United States Agency for International Development (USAID)-funded MotherCare project has been working in collaboration with the Ministry of Health, Indonesia, in three districts (Hulu Sungai Selatan, Banjar and Barito Kuala) of the South Kalimantan province of Indonesia since 1994. The project has implemented a comprehensive program to improve maternal and neonatal health, including decreasing the prevalence of maternal anemia. Initially, the anemia control program focused on increasing the demand for and consumption of IFA tablets by pregnant and postpartum women. To ensure that the demand is supported by adequate supplies of IFA supplements, MotherCare initiated discussions with the Ministry of Health and three pharmaceutical companies to produce an affordable package of IFA tablets. These companies now produce low cost IFA tablets, which are distributed through private sector channels including pharmaceutical warehouses, small shops and the Indonesia Midwifery Organization, at the district and subdistrict levels.

At the beginning of the program in South Kalimantan, a baseline study conducted in the three districts showed that 45.2% of pregnant women were suffering from anemia. Because of this high prevalence, it was assumed that many women enter pregnancy with either anemia or iron deficiency. In addition to strengthening the existing antenatal iron program, it is necessary to improve iron status before pregnancy (Achadi et al. 1997). This is confirmed by the MOH policy to alleviate nutritional anemia not only in pregnant women but

also in women before their first pregnancies. As part of that policy, the MOH is promoting IFA supplements for female workers and school girls.

The government has been implementing a tetanus toxoid (TT) immunization program targeted to all women registering for marriage. This program is conducted collaboratively between the MOH and Ministry of Religious Affairs (MOR). Because all couples register for marriage with the subdistrict Religious Office and receive marriage counseling, it is also a convenient time to give them health messages. Under the TT program, at the time of registration, women must obtain a TT immunization from the subdistrict health center before couples can obtain their marriage registration certificate.

Given this existing health program and the availability of IFA tablets through private sector channels, MotherCare and the MOH initiated a program to introduce IFA supplements to newly wed women and improve iron status before pregnancy through the MOR dissemination system.

## SUBJECTS AND METHODS

The program was implemented in the three districts of South Kalimantan beginning July 23, 1998 and used an information, education and communications (IEC) approach to improve knowledge of anemia and to increase demand for IFA tablets. IEC messages on why and how to take IFA tablets were developed through qualitative research with women of reproductive age. Specific messages for marriage-age women were developed in a separate qualitative study using interviews and focus group discussions with marriage-age women, couples preparing to marry and newlywed couples. The IEC activity, including radio spots, was launched in late July, 1998. At that time and thereafter, all couples registering at the subdistrict Religious Office were counseled on the causes and consequences of anemia and the importance of taking IFA tablets. The couple was given a pocket-sized booklet and a calendar containing messages on anemia and taking IFA tablets; the woman was strongly encouraged to obtain a TT shot and buy and consume 30–60 IFA tablets before becoming pregnant. Women also were counseled that once they have conceived, they should follow the IFA supplementation protocol for pregnant women, which advises them to take at least 90 IFA tablets during pregnancy. Information about where to purchase IFA tablets was reinforced by health care providers at the subdistrict health center when the women came for the TT shot. A radio spot on anemia and IFA tablets was aired at the same time through the five most popular private radio stations in South Kalimantan.

To assess the effectiveness of this program, a cohort of women to be married in Banjar district was followed. All women registering at the subdistrict Religious Office between July 27 and August 22, 1998 were enrolled. The women were asked to go to the subdistrict health center to obtain a TT shot, a finger prick of blood for a hemoglobin (Hb) measurement using the Hemocue and midupper-arm circumference (MUAC) measurement using a tape produced by Ross laboratory. A Hb of <120 g/L was used as the cut-off for anemia and 23.5 cm was used as the cut-off for MUAC. Women were also interviewed about IFA tablet consumption and their knowledge about anemia and any IEC materials they might have seen. All data were collected by health center nurse-midwives who had been trained in assessment techniques.

One month after registration, women were asked to return to the subdistrict health center to obtain the second TT shot and Hb and MUAC measurements. The women were asked about the number of IFA tablets consumed, the number of packages (30 IFA tablets each) purchased, and the number of IFA tablets left in the packages. The women were also asked whether they received IEC materials from subdistrict religious officers. Those who did not come to the health center were visited by the nurse midwives at their home. A second follow-up monitoring was conducted 3–4 mo later when the health center nurse-midwives visited all newly wed women in their homes to assess Hb and reinterview study participants about IFA tablet consumption.

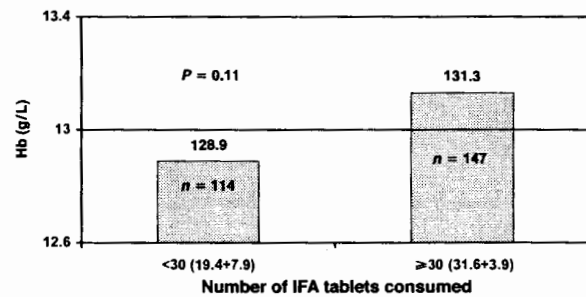


FIGURE 1 Hemoglobin (Hb; g/L) with respect to the number of iron-folate (IFA) tablets consumed (first monitoring).

## RESULTS

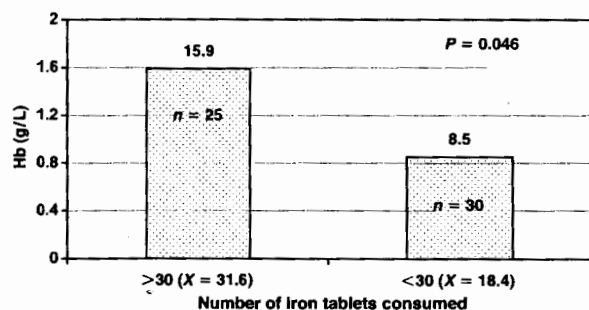
The prevalence of anemia at baseline was 23.8%; at the first monitoring, it was 14.2%, and at second monitoring, it was 14.0%, giving a 40% decrease in anemia prevalence over the course of the program. This was a significant decrease ( $P < 0.05$ ). By the second monitoring, 23% of women reported that they were pregnant. A cut-off of <110 g/L was used for Hb determination in these women. At first monitoring (1 mo after baseline), the average number of IFA tablets consumed was  $26.3 \pm 8.8$  of 35 possible tablets; at the second monitoring (3–4 mo after the baseline), the total number of tablets consumed was  $53.9 \pm 19.9$  of 60 possible tablets.

Seventy-six percent (261 out of 344) of the registered newly wed women were available for the first monitoring at 1 mo postbaseline. Those lost to follow-up migrated to new work locations with their husbands. At the second monitoring, among those 261 women visited, 15% (40 women) had left the research area for the same reason. Those lost to follow-up were similar to those who participated in the first monitoring in baseline age, MUAC, and Hb, but had slightly higher educational levels (45% of those lost to follow-up had some secondary school vs. 30% of those who participated in the first monitoring).

The majority of the women at baseline had received a TT shot at the subdistrict health center and had not received any information on anemia and IFA tablets before the time of the IEC program-launching. One month after the baseline, most of the newly wed women returned to the health center for the second TT shot. At the first monitoring, all women had heard about IFA tablets and more than two thirds of the newly wed women had received the IEC materials (booklet and calendar) from the Religious Affairs official.

At the first monitoring, the majority (98%) of the newly wed women reported that they had taken IFA tablets, 59.1% of subjects consumed IFA tablets every day and 56% of the entire sample of women had taken  $\geq 30$  of 35 possible tablets. Of those who said they consumed IFA tablets everyday, 35.8% experienced side effects. Among those who did not take IFA tablets everyday, 65.7% stated they forgot to take the tablets and about three fourths took <30 IFA tablets. As shown in Figure 1, the Hb levels of newly wed women who consumed <30 (mean  $19.4 \pm 7.9$ ) and  $\geq 30$  (mean  $31.6 \pm 3.9$ ) IFA tablets were 128.9 ( $\pm 11.8$ ) and 131.3 g/L ( $\pm 11.3$ ), respectively, giving a mean change in Hb at the first monitoring of Hb of 2 g/L; this difference was not significant.

However, the effect of the number of IFA tablets consumed is significant for the anemic group. As depicted in Figure 2, the increase in Hb among the anemic newly wed women who consumed  $\geq 30$  (mean  $31.6 \pm 3.34$ ) IFA tablets was 15.9 g/L compared with 8.5 g/L among those who consumed <30



**FIGURE 2** The average increase of hemoglobin (Hb; g/L) by total iron consumed in the anemic group (first monitoring).

(mean  $18.4 \pm 8.72$ ) IFA tablets. This resulted in a significant difference ( $P = 0.046$ ) of 7.4 g/L in Hb increase between the two groups.

## DISCUSSION

This study found that reaching Indonesian women with an educational intervention before pregnancy through the marriage registration system and making low cost IFA tablets available in the community were effective ways in which to decrease anemia and improve their iron status. There was a 40% decrease in anemia prevalence between baseline and the first monitoring (1 mo after the baseline). Among women anemic at baseline, the increase in hemoglobin was significant.

Women were receptive to the intervention, probably because almost 70% of them received IEC materials. However, >30% of the women in the study did not receive IEC materials. Although the program recommended that the MOR officer give the IEC materials to the couple, in many cases it was the parents who went to the subdistrict MOR office to register the couple instead of the couple themselves. To reach all women, it would have been prudent to inform the MOR Officers to counsel parents when they came to register the couple. In addition, interviews with women revealed that in one subdistrict, health center staff rather than MOR staff counseled women, but the materials were distributed by both the health center and the MOR office. The possibility exists that there was a shortage of materials in either site.

Despite the fact that not all women received IEC materials, 98% of them consumed IFA tablets. These results parallel the findings from interviews with women that more women consumed IFA tablets than received educational materials. The high level of compliance with the purchase and consumption of IFA tablets can be explained by the fact that it was strongly recommended by a respected and influential member of the community. However, the behavior of newly wed women also was influenced by information they had heard from radio spots (source of information on IFA tablets for 36.3%), from the health center and community midwives who counseled them to buy and consume iron, or even from their parents who registered them for marriage and may have seen the IEC materials or been told about the program. Another reason for their high level of participation might be that these women are more receptive to behavior change than their older counterparts.

About 7% of the study population had already received the IEC materials at baseline. Some women came to the subdis-

trict MOR office and received IEC materials before being enrolled in the program and going to the Health Center where they were interviewed. This was interesting because it suggested that girls heard radio spots and responded by going directly to the MOR office to obtain more information about what they thought was an important subject.

One problematic result of the study was that there was no difference in the prevalence of anemia between the first monitoring and the second monitoring. This result may be a function of the sample size not being large enough because as anemia prevalence decreases, a larger sample size would have been required to detect a change. Another explanation is the time lag of ~3 mo between the last IFA consumption (the 60th tablet) and the Hb measurement at the 2nd monitoring. It is probable that taking 60 tablets will help to improve iron status, but reverting back to the same environment (i.e., poor dietary intake) will mean that iron stores will be called upon to make up for inadequate dietary intakes. The period was not long enough to fully deplete stores and cause an increase in anemia prevalence, but anemia prevalence could not be expected to decrease further without continued additional iron intake or addressing other causes of anemia (e.g., malaria). This result has raised some concern that the women in this population have marginal iron stores and therefore are sensitive to any change. Short-term interventions before the first pregnancy may help build iron stores but will not be adequate to avert iron deficiency during pregnancy. Continuing iron supplementation during pregnancy is still required to address total iron deficiency in pregnancy.

Although a marriage registration program such as this may be limited to Indonesia, the use of respected members of the community could be a way in which to counsel young women about important health issues before they marry. In addition to improving maternal iron status before pregnancy, this approach to anemia prevention lays the foundation for expectant mothers' heightened awareness of the importance of iron during pregnancy. More follow-up is required with the women involved in this type of program to confirm whether they were more likely to obtain and take IFA tablets when they were pregnant.

## ACKNOWLEDGMENTS

The authors are very grateful to Benny Kodyat, Dini Latief and Annie Kurniawan of the Ministry of Health in Jakarta for the initial idea and encouragement of this study. We are also grateful to Sudarsono, Soejono, HS, Suwandi Makmur, and Soedarsono Abu Yahman of the provincial health office in South Kalimantan for their support of this study. Many thanks to Ray Yip, UNICEF/Indonesia, Nona Utomo, Agoes Seritaji, Teng Sugilar, Evie Martha and colleagues from the School of Public Health, University of Indonesia for technical input and MotherCare staff in South Kalimantan for implementation support.

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