Building up the Blood

Barrier Analysis on a Maternal Iron-Folic Acid Supplementation Program in Madagascar

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Antananarivo, Madagascar

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Infant & Young Child Nutrition Project

USAID FROM THE AMERICAN PEOPLE

IYCN USAID's Infant & Young Child Nutrition Project

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List of Acronyms

ANC	antenatal care
CHW	community health worker
CRS	Catholic Relief Services
FGD	focus group discussion
IDA	iron-deficiency anemia
IDI	in-depth interview
IEC	information, education, and communication
IFA	iron-folic acid
IYCN	Infant & Young Child Nutrition Project
MOH	Ministry of Health
PNNC	National Community Nutrition Program
SBCC	social and behavior change communication
UNICEF	United Nations Children's Fund
USAID	US Agency for International Development
WHO	World Health Organization
WIFS	weekly iron-folic acid supplementation

Introduction

The Infant & Young Child Nutrition (IYCN) Project is the flagship project on infant and young child nutrition of the US Agency for International Development (USAID). Since 2008, IYCN has been in Madagascar working to strengthen programs that address the high rate of malnutrition among mothers and their young children. One of the initial accomplishments involved working with governmental and nongovernmental partners to develop a comprehensive, national maternal nutrition strategy that includes recommendations for how nutrition programs can be strengthened. As a follow-on activity, IYCN conducted formative research with the intent of identifying barriers and facilitators to women taking iron-folic acid (IFA) supplements during pregnancy in order to improve the impact of a community-based IFA supplementation program. This research report is to be used by USAID and the implementers (Santénet2 project partners) of the community IFA program as well as any community-based project looking to enhance the impact of maternal nutrition activities.

The research highlights factors preventing Malagasy women from taking IFA supplements during pregnancy: lack of knowledge about the contribution of dietary quality and malaria to anemia; cultural prohibitions encouraging women to hide their pregnancy; and side effects. In addition, it was found that community health workers (CHWs) are a critical link between the health facility and the community in providing the support that women need in order to ensure healthy pregnancy outcomes.

Background

Anemia is most commonly caused by a deficiency of iron, and other contributing factors include blood loss, micronutrient deficiencies, acute and chronic diseases, genetic disorders, and reproductive factors.[1] A severe deficiency of iron can result from inadequate dietary intake, poor absorption of iron due to phytates, and other inhibitive substances in the diet, or increased iron demand during growth and pregnancy. Iron-deficiency anemia (IDA) during pregnancy is associated with low birth weight, pre-term delivery,[2] and neonatal mortality.[3] While somewhat limited, there is evidence to suggest that maternal anemia puts a woman at increased risk of maternal mortality.[4, 5, 6]

[1] World Health Organization (WHO). *Iron Deficiency Anemia. Assessment, Prevention and Control. A guide for programme managers*. Geneva, Switzerland: WHO; 2001.

[2] Scholl TO, Hediger ML, Fischer RL, Shearer JW. Anemia vs iron deficiency: increased risk of preterm delivery in a prospective study. *Am J Clin Nutr*. 1992;55:985–988.

[3] Zang L, Dibley MJ, Cheng Y, Dang S, Chang S, Kong L, Yan H. Impact of micronutrient supplementation during pregnancy on birth weight, duration of gestation, and perinatal mortality in rural western China: double blind cluster randomised controlled trial. *BMJ*. 2008;7:337.

[4] Llewellyn-Jones D. Severe anaemia in pregnancy (as seen in Kuala-Lumpur, Malaysia). *Aust N Z J. Obstet Gynaecol*. 1965;5:191–197.

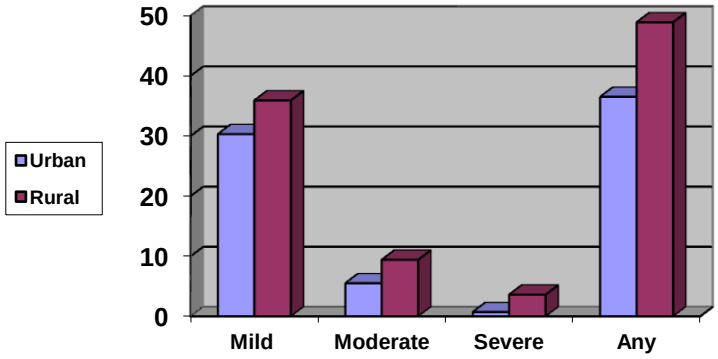
[5] Chi I, Agoestina T, Harbin J. Maternal mortality at twelve teaching hospitals in Indonesia-an epidemiologic analysis. *Int J Gynaecol Obstet*. 1981;19:259–266.

[6] Murray-Kolb, unpublished research findings. Presented by Dr. Rolf Klemm during CORE Group Spring Meeting, 2011. Addressing Anemia Full Spectrum: Recent scientific findings, implementation issues & opportunities for integration. 2010.

The World Health Organization (WHO) recommends three approaches to preventing anemia during pregnancy: weekly iron-folic acid supplementation (WIFS) to women of reproductive age, daily IFA supplementation for women during pregnancy, and presumptive hookworm treatment during pregnancy in endemic areas. While WIFS is a newer approach, IFA supplementation and hookworm are commonly included in antenatal care (ANC) at clinics.[7] During pregnancy, IFA supplementation undoubtedly improves maternal iron status, and can prevent iron deficiency and anemia, depending on the iron status at the time of conception.[8]

According to the most recent Demographic and Health Survey (2008–2009), anemia in Madagascar is due primarily to iron deficiency and malaria. Using the WHO classification, IDA in Madagascar is a borderline severe public health problem, and a greater problem in rural areas in comparison to urban areas.[9] Approximately 38 percent of pregnant women are anemic,[10] with the majority classified as mildly (22%), and fewer as moderately and severely (16% and 0.3%, respectively). Moreover, IDA is the cause of 20 percent of maternal deaths associated with complications during pregnancy.[11]

Figure 1: Urban versus rural anemia rates (women ages 15–49), 2003/2004



A nutrition landscape analysis carried out by a national and international interagency team in 2008 highlighted what little was being done to address maternal anemia in Madagascar. It showed that IFA tablets were available for purchase only at the local pharmacies, which are not easily accessible. According to the National Policy to Reduce Micronutrient Deficiencies, IFA supplements are to be provided to pregnant women during antenatal consultations. Insecticide-treated bed nets, malaria prophylaxis, and de-worming medication are distributed as well. However, women commonly do not begin seeking care at health clinics until late in their

[7] Stoltzfus RJ. Iron interventions for women and children in low-income countries. *J Nutr*. 2011;141(4):756S.
[8] Allen LH. Anemia and iron deficiency: effects on pregnancy outcome. *Am J Clin Nutr*. 2000;71(5):1280S–1284S.
[9] National Nutrition Office, Madagascar. *Madagascar National Maternal Nutrition Strategy*. National Nutrition Office; December 2008.
[10] Institut National de la Statistique (INSTAT) and ICF Macro. *Demographic and Health Survey for Madagascar 2008–2009*. Antananarivo, Madagascar: INSTAT and ICF Macro; 2010.
[11] Santénet2. Study on the feasibility of universal access to iron and folic acid supplementation of pregnant women. Santénet2; September 2010.

pregnancy.[12] From the landscape analysis, a recommendation was made for micronutrient supplements to be provided to all pregnant women using National Community Nutrition Program (PNNC) workers for outreach and distribution. In response, the USAID/Santénet2 project implemented by a consortium of partners—(RTI International, CARE International, Catholic Relief Services [CRS], Population Services International, IntraHealth, and Dinika sy Rindra ho an'ny Vehivavy)—established a community IFA supplementation pilot program to improve universal distribution of IFA supplements. The program was designed to contribute to the National Maternal Nutrition Strategy objective of reducing the prevalence of anemia in pregnant women and adolescents.

The community IFA supplementation pilot program, carried out from September 2009 to February 2010, took place in 14 districts where CARE and CRS implement various activities. At the health centers in these target districts, pregnant women received a free sachet of 30 IFA supplements during their first prenatal consultation, regardless of their iron status. In the subsequent five months, the women were to receive IFA tablets from the CHWs in their respective villages, at a cost of $0.05 per monthly dose (which contributes to the transportation cost of the CHW to collect the IFA at the health center). During the six-month period, a study evaluating the feasibility of this community approach to IFA supplementation found that the CHWs were effective in monitoring the pregnant women during and following their pregnancies, distributing IFA supplements according to protocol, and referring women to the health center for prenatal care, malaria treatment, and delivery. More specifically, pregnant women who completed six months of IFA supplementation (even continuing after delivery) increased from 9 percent to 57 percent, and pregnant women receiving IFA supplements increased by 35 percent.[13] Informants expressed the opinion that due to the IFA supplements being available at the community level, there were improvements in geographic and financial access, as well as improvements in the health of both mothers and their babies, and a considerable amount of time saved for the women. A recommendation coming out of the study was for IFA to be more widely distributed at the community level and to carry out qualitative research on pregnant women's perceptions and compliance with taking the supplements.

Research Purpose and Objectives

To address the problem of maternal anemia in Madagascar, more needs to be understood about Malagasy women's knowledge, attitudes, perceptions, and behaviors related to taking IFA supplements during pregnancy. In an effort to do this, formative research was carried out in January 2011 to assess pregnant women's response to the Santénet2 community-based IFA supplementation program. The goal is to use the results from the research to create a more effective behavior change strategy, messages, and activities, thereby improving the impact of the community IFA supplementation program. This will contribute to implementing the National Maternal Nutrition Strategy at the community level.

Using the Barrier Analysis methodology, barriers and facilitators of pregnant women taking IFA supplements were identified. As a rapid assessment tool for behavior change programs, the

[12] Anecdotal evidence gathered from formative research carried out by the IYCN Project in January 2011.
[13] Santénet2. Study on the feasibility of universal access to iron and folic acid supplementation of pregnant women. Santénet2; September 2010.

Barrier Analysis is useful for identifying behavioral determinants associated with a specific behavior. While it can be carried out at the beginning of an intervention to develop appropriate behavior change messages, strategies, and intervention activities, it can also be used in an ongoing program to further assess why a promoted behavior has not been adopted despite programmatic efforts. Doers and Non-Doers of a well-defined behavior are identified and separately asked a series of questions to explore behavioral determinants that inhibit or encourage an action. In this case, pregnant women who take IFA supplements every day are defined as "Doers," while pregnant women who started and stopped or infrequently take IFA supplements are defined as "Non-Doers." This distinction was made based on previous research[14] done during the Santénet2 pilot program, showing that while pregnant women had access to IFA supplements, almost half were not taking them in compliance with WHO recommendations.[15] The eight behavioral determinants explored through questions include:

- Perceived susceptibility.
- Perceived severity.
- Perceived action efficacy.
- Perceived social acceptability.
- Perceived self-efficacy.
- Cues for action.
- Perception of divine will.
- Positive and negative attributes of the behaviors.

While focus group discussions (FGDs) and in-depth interviews (IDIs) have been used as qualitative research methods since the methodology's inception, it is now recommended to use only IDIs and no longer use FGDs. The reason for the shift in recommendation is the difficulty in identifying real differences between the Doers and Non-Doers using the FGD method. Individual interviews with 45 Doers and 45 Non-Doers are sufficient for identifying statistically significant differences between the two groups.

To guide the development of this research, a formative research tool[16] and formative research guide[17] were used. The tool was used to carry out the analyses and use the results to generate recommendations to make the maternal nutrition program more effective. Within the formative research guide, a maternal nutrition framework illustrated components to consider when assessing dietary adequacy during pregnancy and lactation. IFA supplementation is just one of those components.

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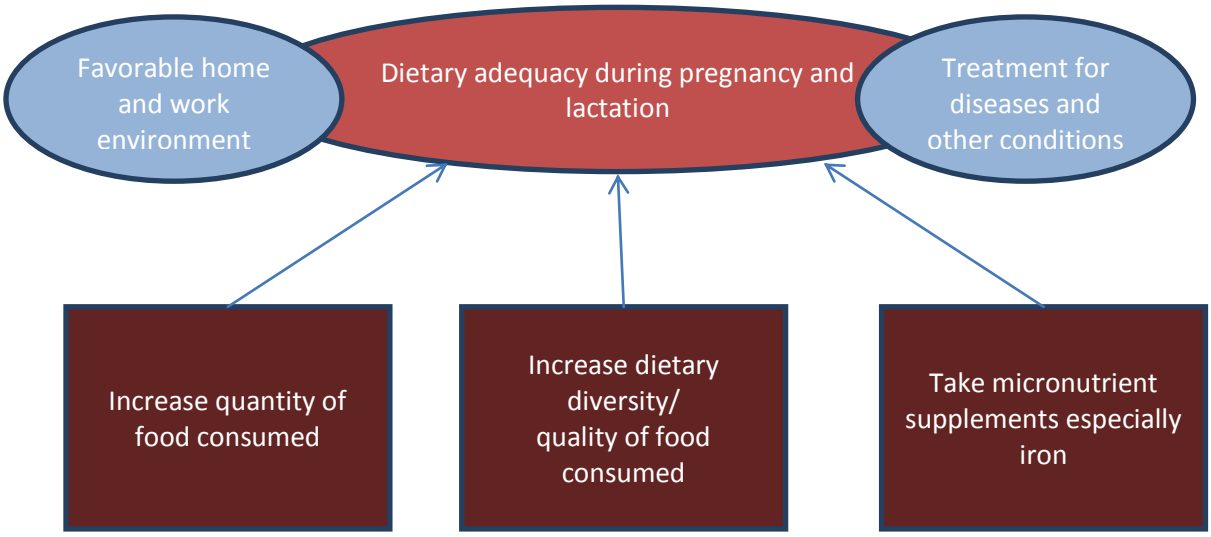
[14] Santénet2. Study on the feasibility of universal access to iron and folic acid supplementation of pregnant women. Santénet2; September 2010.

[15] WHO recommendation is that women receive 60 milligrams of iron and 400 micrograms of folic acid on a daily basis for six months during pregnancy in areas where the anemia prevalence is less than 40 percent, and to continue for an additional three months during the postpartum period where the prevalence is greater.

[16] Davis Jr, Thomas P. *Barrier Analysis Facilitator's Guide: A tool for improving behavior change communication in child survival and community development programs*. Washington, DC: Food for the Hungry; December 2004.

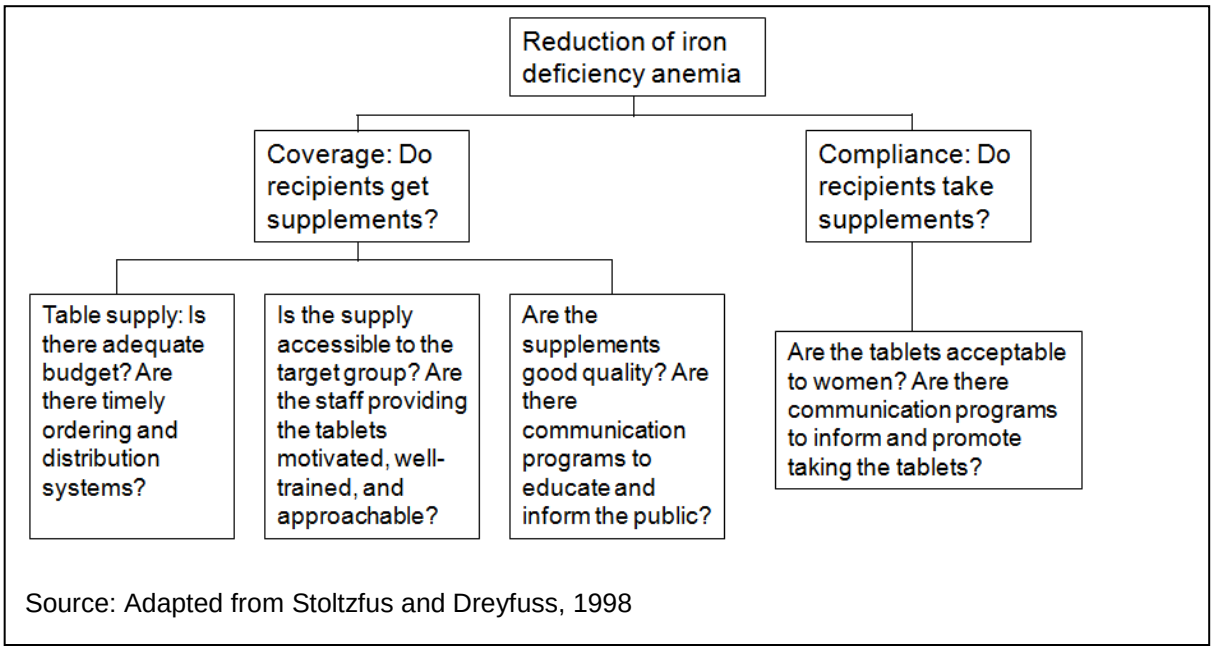
[17] Infant and Young Child Nutrition Project (IYCN). *Guidance for formative research on maternal nutrition*. Washington, DC: IYCN; August 2011.

Figure 2: Major factors in achieving dietary adequacy in pregnancy and lactation



Also within the formative research guide is a framework for assessing the effectiveness of iron supplementation programs. A focus was placed primarily on the compliance aspects of IFA supplementation, while also gathering some data on coverage and maternal dietary practices during pregnancy.

Figure 3: Elements to consider in iron-supplementation programs



Source: Adapted from Stoltzfus and Dreyfuss, 1998

The methodology used in the Barrier Analysis will be further described in the following section. Overall, the objectives of the research were to:

- Qualitatively assess knowledge, attitudes, perceptions, and behaviors around maternal nutrition in one program area of the IFA supplementation program in order to identify facilitators of improved behaviors, as well as barriers to change.
- Provide a tool (i.e., Barrier Analysis) and framework (i.e., IYCN maternal nutrition framework) to build partner capacity to conduct similar analyses that can strengthen the implementation of the National Maternal Nutrition Strategy at the community level.

Methods

Barrier Analysis on Santénet2 IFA Program

The research was conducted in Fénérive Est, a coastal area in the northeast of the country. Using a convenience sample, one district was chosen where the Santénet2 project implements their activities. The research team consisted of CARE International national staff and Santénet2 program staff. Research participants included pregnant women and CHWs within the target district's health facilities' catchment area. The location of the study is provided in **Annex 1**.

During a one-day session, the research team was trained on the Barrier Analysis methodology. Given their previous experience in conducting FGD and IDI, there was no additional training conducted on carrying out these methods. Following the methodology training, a one-day consensus-building workshop was held with stakeholders (CRS, CARE, Santénet2, IYCN, and other nutrition partners) to introduce the maternal nutrition framework developed by IYCN and the Barrier Analysis methodology developed by Food for the Hungry, as well as to adapt the research tools to the IFA program and local context.

Prior to conducting the study, the FGD and IDI questionnaires were pretested with a group of pregnant women and CHWs. Women understood anemia as a condition of "insufficient blood." Information gathered during the pretest was used in revising the questions. Also during the pretest, it was confirmed that the study would involve talking only with pregnant women, as lactating women were not accustomed to going to the health centers and continuing with IFA supplements after delivery. Continuation of IFA following delivery would be another behavior to examine using the Barrier Analysis methodology.

The study consisted of separate FGDs of Doers and Non-Doers; in-depth interviews with CHWs who play a key role in the IFA program; and a brief assessment of dietary intake of pregnant women and market availability of iron-rich foods. The questionnaires used to carry out the study are in **Annexes 2 and 3**.

Focus Group Discussions

FGDs were held separately with pregnant women who take IFA supplements every day (defined as "Doers" of the behavior promoted by the program) and pregnant women who started and stopped or infrequently take IFA supplements (defined as "Non-Doers"). The initial plan was to conduct two FGDs (each consisting of 8–14 participants) with "Doers" and two FGDs with

"Non-Doers." The study team conducted several FGDs with of a total of 27 Doers. Several FGDs were also held with 12 Non-Doers. The FGDs were carried out at the health centers, as it was easiest to access the women who were already gathered for prenatal care. In general, pregnant women go to the health centers for prenatal care starting—on average—at six months of pregnancy. There were many more women meeting the criteria of "Doers" who arrived for their prenatal care. As for the "Non-Doers," there were several challenges encountered in identifying them. A misunderstanding of the selection criteria when it was translated into the local language initially resulted in gathering women who had never started taking IFA supplements. On another occasion, women did not show up to the health center, most likely due to the heavy rains and floods, planting obligations at this time of the year, and the long distance to the health center. By driving to several villages, we were able to locate enough women to conduct the discussions.

In-depth Interviews

Five CHWs were interviewed individually to better assess their role in the community IFA supplementation program. Prior to the six-month Santénet2 IFA supplementation pilot program, CHWs did not exist within the targeted communities, and it was only the health center that distributed the IFA supplements. The CHWs are non-paying positions. Several CHWs explained that they are motivated by the "respect they receive in their roles" and the "opportunity to develop their communities." The CHWs were selected based on the following criteria: good communication skills, respected by the community, and at least minimal reading and writing capability. Their role involved: (1) identifying pregnant women in their respective villages and encouraging them to go to the health centers for their four prenatal consultations and delivery; (2) monitoring their intake of IFA supplements; (3) counseling them on managing the side effects of IFA supplements; and (4) reaching women who live far from health centers. As noted above, the study carried out during the pilot program showed that with the increase in stock of IFA supplements at the community level and additional distribution efforts and activities to raise awareness conducted by CHWs, the percentage of pregnant women taking IFA supplements for six months increased significantly. Pregnant women interviewed during the study claimed part of their increased usage was due to the availability of IFA supplements with the CHWs and the support they received from CHWs through home visits. Clearly, CHWs play an important role that could substantially improve the program with further support.

Dietary Assessment

Norms, opinions, and judgments concerning dietary intake during pregnancy were explored through FGDs with pregnant women and structured interviews with CHWs. In general, the quality of the diet of pregnant women does not change from their normal diet; however, it was reported that the quantity of food at each meal is reduced and more meals are eaten throughout the day. The typical diet consists of rice with greens and bouillon (commonly made from fish). This is consumed three times per day. The most common protein added to a meal is fish, but in such small amounts that it is used more as flavoring rather than a substantive nutrient in the meal. Households whose livelihoods center around fishing have better access to, and are more likely to consume, a greater amount of fish and seafood. For others, it is too expensive. Those of higher socioeconomic levels can afford to eat the traditional Zebu beef, poultry, eggs, and a wide variety of seafood. The most inexpensive foods that are rich in iron are the fresh, dark leafy green vegetables (*moringa*, *crisson*, *ananas,* and squash, manioc, and sweet potato leaves) and

dried legumes (beans and cowpeas). Women eat fruit every day, depending on what is seasonally available. Throughout the year, they may consume mangos, guava, jackfruit, papaya, oranges, bananas, watermelon, and several other tropical fruits.

A brief market survey was conducted to look at what foods are available, at what cost, and in what quantity. A list of foods, prices, and photos are provided in **Annex 4**. Dietary information gathered through FGDs was considered in formulating the program recommendations.

Findings

Using the Barrier Analysis constructs, the following is an overview of what was identified from completing the analytical table in **Annex 5**. Some of the findings confirm those discovered in the Santénet2 IFA pilot program study.

Perceived Susceptibility (Identified Barrier)

Both the Doers and Non-Doers are aware of a pregnant women's susceptibility to anemia. They describe anemia as an "insufficient amount of blood." While both groups recognized that dietary inadequacy ("poor diet" in terms of quantity) could cause the condition, neither made the link with malaria, which is endemic. Therefore, the link between malaria and anemia needs to be strengthened, as well as promotion of dietary quality. Many women mentioned feeling "tired" and having pale palms and eyelids. Several women complained of feeling "out of breath" and "dizzy." A few attributed yellow palms, yellow eyes, leg swelling, lack of appetite, and weight-loss to having an "insufficient amount of blood." They were aware of women in their families and communities who had signs of anemia. The social and behavior change communication SBCC materials already include a description of the illness.

Perceived Severity

The severity of anemia seemed to be well recognized by both groups. Women most frequently mentioned fatigue, miscarrying, and complications (including death) during delivery due to an extreme loss of blood. In addition to the effects on the mother, it was well recognized that the baby could be affected through premature delivery, poor weight gain *in utero*, and increased risk of mortality during birth. All of the SBCC materials, except for the health booklet distributed by the CHWs, contain this information. Although this is not a barrier, many of the pregnant women requested to receive information to take home, which means that not all of them are receiving the health booklets. It is thought that part of the increased interest may be due to a common practice of purchasing and carrying blank notebooks for daily use. These notebooks are similar to the ones already being distributed through the health centers and CHWs.

Perceived Action Efficacy

Regeneration of the blood ("building up the blood")—particularly following delivery—was the most commonly stated benefit of taking IFA supplements. Almost as frequently mentioned by both groups were the health benefits to the mother and baby. Less frequently mentioned was how IFA supplements make the yellow color of their skin go away. While the Non-Doers expressed a desire to take IFA supplements, the side effects (described further down) were what primarily

prevented them from doing so. All SBCC materials contain information on the benefits of taking IFA.

Perceived Social Acceptability (Identified Barrier)

While both groups said they receive encouragement from their families (husbands in particular) and community (especially other pregnant women) to take the IFA supplements, it is clear that they don't receive adequate support from the staff at the health center and the CHWs. It was even mentioned that "pregnant women take IFA; it is just what they do." The lack of advice on handling side effects was strongly expressed by Non-Doers. The Doers did not feel or report a lack of support. They were able to tolerate the IFA supplements, yet they still want more interaction with the CHWs. The most common complaint was that health center doctors do not have the time to counsel them about handling the side effects, and do not explain the reason for taking the IFA supplements, other than to say to take it every day. Many of the Doers and Non-Doers said they were not receiving home visits from the CHWs. Particularly, the Non-Doers expressed greater interest in having more support from the CHWs, than from the doctors at the health centers, and to receive information regarding IFA supplements (e.g., why pregnant women should be taking the IFA supplements, ways to overcome the side effects, reminder of when to take the IFA supplements, etc.) in a take-home flyer. With a 62.5 percent literacy rate among women, it is important that any SBCC materials contain both images and text to meet the needs of a population with varying reading and writing ability.[18]

It is clear that the CHWs can play an important role in identifying women earlier in pregnancy, encouraging them to attend all four of their ANC visits, supporting pregnant women in managing their side effects, and improving their understanding of the importance of taking IFA by counseling women during home visits. Finally, the collaboration between the doctors at the health centers and the CHWs needs to be strengthened, so that the pregnant women can be better monitored at the village level. At the particular site where the study was carried out, there is an agreement between the health center and CHWs that women must complete their first two to three prenatal consultations before they can receive the IFA supplements through the CHWs. This hinders the role of the CHWs to do their job; however, this was found not to be the case at every health center. Strengthening communication and collaboration between the health center staff and CHWs through a two-way referral system would improve program effectiveness. Given the fragile political situation, USAID partners at this time are only allowed to hold information and coordination meetings, but not reinforce their capacity in any way.

Perceived Self-Efficacy (Identified Barrier and Facilitator)

The availability of IFA supplements is not a barrier. At the time of the study, there was approximately three months' worth of IFA supplements remaining for distribution through the CHWs. Program efforts need to be made to secure a supply in the future. The stock at the health centers is secure, as the revenue brought in from the services is used to buy the supply from the national pharmacy. UNICEF supports health centers in some Santénet2 project zones. The cost of obtaining IFA supplements is not a barrier; however, it is more expensive at the health center (15 cents), compared to receiving it from the CHWs (five cents). The women like going to the

[18] Central Intelligence Agency, The World Factbook, Madagascar, 2003 estimate.

health center because they receive the full prenatal care package (i.e., monitoring of the health and weight gain of the mother and health and growth of the baby; provision of de-worming medication, mosquito net, tetanus vaccination, malaria prophylaxis, IFA supplements; nutrition counseling; HIV testing, etc.) for 50 cents. At the health center, the first 30 IFA supplements are free, and women pay for the consecutive months' supply (15 cents). However, the distance to the health center is a barrier. It takes an average of two to three hours to walk to the center, or they must pay, on average, $1 to take transportation to get there. A facilitating factor is that the CHWs can provide the IFA supplements at a lower cost than those sold at the health center for the months between the ANC visits.

Cues for Action

Although there did not appear to be a problem with Non-Doers remembering to take IFA, the Doers provided some examples for how they remember to take the IFA supplement, including: taking it with their dinner; putting the pills on the bedside table or dinner table; referring to the dates of the next prenatal visit in the health card; and counting the number of pills remaining in their sachet. In terms of SBCC materials, all of them explain the need to take IFA supplements every day for six months, even continuing after pregnancy—except for the Ministry of Health (MOH) health center booklet. Because the project cannot change the materials produced by the government health centers, this was not addressed. Although not a barrier, this factor could be strengthened by establishing peer support group between Doers and Non-Doers, so that successful strategies for taking IFA supplements can be shared. All CHWs agreed that this was a good idea and would be possible once per month for part of a day of rest (Tuesday, Thursday, or Sunday).

Perception of Divine Will (Identified Barrier)

While there are no cultural prohibitions or religious beliefs concerning taking IFA supplements, there are barriers related to pregnancy. One is the belief that women should hide their state and not discuss their pregnancy until they start showing and are more certain that they will carry to term. In this particular region, if a woman cannot reproduce she is disowned by the community and rejected by her husband. This delays them from going for their first health center visit and taking IFA. Typically, pregnant women go to the health center for prenatal consultations starting at six months. With appropriate training, CHWs could identify women earlier in pregnancy using a questionnaire.

Positive and Negative Attributes of the Action (Identified Barrier and Facilitator)

It is evident that one of the main barriers keeping women from taking IFA supplements regularly is the side effects, including stomach aches, dizziness, vomiting, headaches, and fatigue. In addition, several of the women felt the IFA supplements had a bad taste and created bad odors around them after taking it. Not only does the health booklet lack information on how to manage the side effects, but the majority of women are not receiving any counseling by the CHWs or health centers on side effects. Through peer support groups and home visits conducted by the CHWs, women could learn about ways to manage the side effects. Doers shared positive strategies, such as taking the supplement before bed or with lots of water, to reduce the nausea. The program does not have the capacity to address the taste and odor of the supplements.

Recommendations and Discussion

A final workshop was held with key nutrition stakeholders (CARE, Santénet2, USAID, WHO, UNICEF, and other nutrition partners), where recommendations on how to improve the IFA program were discussed. The aim was to build partner capacity to conduct analyses to better facilitate behavior change throughout the program, as well as to share the results of this specific Barrier Analysis.

Based on the findings from the analysis and discussions among the stakeholders during the final workshop, it was recommended that the Santénet2 project partners would:

1. Assemble existing maternal nutrition documents (national policies, strategies, and activities), including those specific to IFA supplementation (Santénet2 pilot project, Barrier Analysis findings, expansion of Santénet2 project in the south) to present when seeking support for IFA activities (i.e., purchase of IFA supplements, production of SBCC materials, training for CHWs, logistical support for IFA supplementation, activities for raising community awareness, acceptance of IFA activities, and incorporation into the second phase of the National Nutrition Action Plan).

2. Scale up the distribution of IFA supplements at the community level by taking into account the following components:
    - Assure the availability of IFA supplements within the community before the current stock is depleted.
    - Determine a strategy for subsidizing the cost of IFA supplements to women in the future.
    - Strengthen the technical capacity of CHWs and communication linkages with the health centers.
    - Strengthen the role of CHWs in:
        a. Carrying out home visits for pregnant women.
        b. Counseling pregnant women on the advantages of IFA supplements, on managing the side effects, on how to take the supplements, as well as the reasons for taking the IFA supplements and the relationship between malaria and anemia.
        c. Supplying pregnant women with IFA supplements between ANC visits.
        d. Using SBCC materials in awareness-raising activities.
        e. Identifying pregnant women before the third month of pregnancy.
        f. Encouraging women to complete the recommended four prenatal visits at the health centers.
    - Organize refresher trainings on the IFA supplementation and counseling techniques for CHWs.
    - Train CHWs on using algorithms and questionnaires to identify women earlier in pregnancy.
    - Harmonize SBCC materials used at the health facility and community level.

3. Improve coordination of activities between health centers and CHWs by the following actions:
    - Holding regular meetings between the health center staff and CHWs.
    - Strengthening the referral system, so that pregnant women are closely monitored at the village level by the CHWs.

4. Update the community health booklets (distributed to pregnant women) and improve distribution:
    - Include information regarding IFA supplements: reasons for taking IFA supplements during pregnancy/lactation; the necessity to take IFA supplements every day for six months, even after delivery; how to manage side effects of IFA supplements; causes and symptoms of anemia, including malaria; consequences and the severity of anemia; and the efficacy of IFA supplements.
    - Include messages on increasing the quality and quantity of the diet during pregnancy and lactation, including promoting foods rich in iron (e.g., dark green leaves, dried legumes, meat, fish, poultry, eggs, and seafood), avoiding drinking coffee or tea (inhibitors of iron absorption) at least two hours from the time of eating iron-rich foods, consuming foods rich in vitamin C with foods rich in iron to enhance iron absorption, germinating and fermenting cereals and legumes to improve iron absorption, and increasing the number of meals during pregnancy/lactation.
    - Improve the distribution of the health booklets through the community, by seeking additional funding to support free distribution of booklets by both health centers and CHWs.

5. Establish peer support groups between Doers (i.e., women who take IFA supplements every day) and Non-Doers (women who started and stopped taking IFA supplements every day) to exchange ideas on how to continue taking IFA supplements.

6. Potential future research: Carry out a Barrier Analysis to better understand the barriers associated with women starting their prenatal visits at six months of pregnancy, where the early pregnancy screening tool is not being used.

Lessons Learned

In terms of recommendations with regard to the study, carrying out several more FGDs could strengthen the findings from the analysis. Due to time restrictions, we were limited to only carrying out a few FGDs with Doers and Non-Doers. Prior to conducting the study, it was requested that women who meet the Doer and Non-Doer criteria be brought together in order to conduct the FGDs. The health center was chosen by the study staff. Because the Non-Doers may be less likely to attend the health centers for prenatal visits, it would be wise to identify village sites where Non-Doers could be easily reached.

To gain additional perspective, it would have been interesting to conduct the Barrier Analysis using only the individual interview method as opposed to the focus group method, though there

are limitations to this method, such as the required sample size (a minimum of 30 Doers and 30 Non-Doers per behavior, but it is recommended that there be 45 per group). The more structured FGD format may have been limiting. In a Barrier Analysis, the objective is to cover questions on all eight determining factors, whereas in an FGD, questions are generally used only as a guide to facilitate the discussion. Since the study took place during the rainy season, women did not have a lot of time to talk due to long commuting distances and agricultural cultivation activities. Moreover, it was a challenge to cover all the questions in great detail during FGDs.

In order to gather richer dietary intake information, it would have been useful to conduct 24-hour dietary recalls with pregnant women involved in the program and conduct observations at their households while they prepared a meal.

Finally, to complete the analysis, at least two days are needed. The first day, to get all the information on the table and draft the recommendations, and another to review and ensure all that was gathered has been taken into consideration. Holding a final workshop is a way to involve senior project coordinators so they can advocate for the recommendations.

Progress to Date

Since carrying out this research, much progress has been made in terms of carrying out the recommendations. The following are a few of the highlights:

- Expanded community-based distribution of IFA from 14 to more than 100 communes;
- Inclusion of distribution of IFA supplements through CHWs throughout the country in the next five-year National Nutrition Action Plan;
- Advocacy for and provision of IFA from UNICEF and MOH;
- Increased production of SBCC materials to be used by CHWs;
- Increased involvement of health center personnel in monitoring and coordinating IFA distribution with CHWs in all Santénet2 project areas.

Annex 1. Schedule of focus group discussions and in-depth interviews

Day	Location	Group	Number	Notes
Wednesday	Ambalahasina Health Center	Doers	5	Pretest of questionnaire.
		Non-Doers	2	
Thursday	Ampasimbe Onibe Health Center	Doers	11	Pregnant women attending prenatal visits at health center.
		Doers	12	
Friday	Hotsika Health Center	Non-Doers	3	Many more women participated in the focus group; however, their information was not considered, as they did not meet the Doer and Non-Doer criteria.
		Doers	2	
Saturday	Mahatsara Village	Non-Doers	5	All women had completed at least one ANC visit.
		CHWs	1	
	Ambalahasina Health Center	Non-Doers	2	Were the same women from the pre-test.
		Doers	1	
		CHWs	2	Individual Interview.
	Marofaria Village	Non-Doers	2	
		Doers	1	
	Hotsika Village	CHWs	3	Individual Interview.
	Hotsika	Market visit and small food shops, community gardens		
		TOTAL		
		Doers	27	
		Non-Doers	12	

Annex 2. In-depth Interview Questionnaire for Community Health Workers

Individual Interview Guide for Community Health Workers

Informed Consent: Thank you for taking the time to speak with us today. We would like to talk with you about the community IFA supplementation program: what is working well with the program, and what could be working better. We'll be writing a report for CARE based on our discussions with you and others. We will not use your name, but we may use direct quotes from what you tell us in the report. Your participation in today's interview is totally voluntary; there is no problem if you do not wish to participate, or if you do not want to answer any individual question. Do you have any questions for me before we start? Again, thank you for your time. Your information can help to make the program better. Shall we start?

Respondent gave verbal consent: Yes/No

1. What is the goal of this project?

2. What activities do you do in a typical week?

3. How are things going with the project generally?

4. What challenges do you face in completing the activities you mentioned above?

   Probe 1: How does the staff keep track of the supply and order more? Who fulfills the supply order? Is that system working well? Do you have any suggestions to improve it? Are the ordering and distribution systems functioning well?

   Probe 2: Do you ever have inadequate pills for the number of women who come? Do you ever have no pills on distribution days? When is the last time that happened (either inadequate or none)? How often has that happened in the last six months (either inadequate or none)?

   Probe 3: Do you have confidence that the supplements the project is distributing are of good quality? Why or why not?

5. What training have you received in this project? What additional training would you like?

6. What motivates you to do this work? What could the project managers do to help workers stay motivated?

7. Are there pregnant women in the project communities who do not participate in the project? If yes, what makes it hard for them to participate? Would you have enough pills if all pregnant women participated?

8. Do some women receive the pills but not take them? If yes, why? What could the project do to support more women to take the pills daily?

9. Does the project have communication activities to educate and inform the community? Please tell me about them.

Additional Questions on Dietary Consumption

What is the typical diet of pregnant women?

Is there anything they believe they should avoid during pregnancy?

Is there anything they believe they should eat during pregnancy?

What iron-rich animal- and plant-based foods are affordable and available all year long?

Are there meat, poultry, fish, eggs, dark leafy-green vegetables, and legumes?

Do the pregnant women eat these?

Do you encourage women to eat foods rich in iron?

What SBCC tools do you use in counseling them to eat these foods?

Annex 3. Focus Group Discussion Questionnaire

Informed Consent: Thank you for taking the time to speak with us today. We would like to talk with you about the community IFA supplementation project that you participate in. We will be writing a report for the project based on our discussions with you and others. We will not use your name, but we may use direct quotes from what you tell us in the report. Your participation in today's interview is totally voluntary; there is no problem if you do not want to participate, or if you do not want to answer any individual question. Do you have any questions for me before we start? Again, thank you for your time. Your information can help to make the project better. Shall we start?

Determinants and Associated Questions

Determinant #1—Perceived susceptibility

What have you heard about insufficient blood?

How does the condition manifest itself?

Do you know what causes insufficient blood?

Is it a problem for pregnant women in this community?

Determinant #2—Perceived severity

Why is insufficient blood a problem?

What are the possible consequences?

Can a pregnant woman die from insufficient blood? Why?

Determinant #3—Perceived action efficacy

How effective is taking an IFA supplement for pregnant women?

Can you give some examples?

Can taking IFA reduce the symptoms of insufficient blood? How?

Determinant #4—Perceived social acceptability

Do pregnant women who take IFA supplements receive support from their family? Why?

Do pregnant women who take IFA supplements receive support from their community? Why?

Determinant #5—Perceived self-efficacy

Is it easy to get IFA (availability, price)? If yes, how; if not, why?

Is it possible to take IFA daily? For 6 months?

Determinant #6—Cues for action

How do you remember to take IFA supplements each day?

How would you recommend remembering to take IFA supplements every day and to continue each month?

Determinant #7—Perception of divine will

Do your customs and religion allow pregnant women to take IFA supplements? Why?

Determinant #8—Positive and negative attributes of the preventive action

What is good about taking IFA supplements every day?

What is bad about taking IFA supplements every day?

Dietary Consumption

What do pregnant women eat?

Do women change their eating habits during pregnancy?

What foods build up the blood?

Do pregnant women eat meat?

How many times per week?

Why do they eat meat, or why do they not eat it?

Do pregnant women eat poultry?

How many times per week?

Why do they eat poultry, or why don't they eat it?

Do pregnant women eat fish?

How many times per week?

Why do they eat fish, or why don't they eat it?

Do pregnant women eat seafood?

How many times per week?

Why do they eat seafood, or why don't they eat it?

Do pregnant women eat eggs?

How many times per week?

Why or why don't they eat them?

Do pregnant women eat dark leafy-green vegetables?

How many times per week?

Why or why don't they eat them?

Do pregnant women eat dried legumes?

How many times per week?

Why or why don't they eat them?

Annex 4. Local Iron-Rich Food Items and Prices

A typical meal consists of rice with a sauce made of green leaves, fish, dried legumes, or meat, depending on the household's economic status and livelihood. In addition, fruits are eaten every day depending on the season (e.g., pineapple, mangos, guava, jackfruit, litchi, oranges, melons, etc.).

2,034 Ar = $1 (US)

Figure A1. Plate of rice for one person (right)

Rice
1,200 Ar per kilogram
One plate per person (300 grams)

Green leaves
One bunch of green leaves cost approximately 100 Ar
3 bunches may be used in a dish for 5–6 people

Dried legumes
Dried legumes cost approximately 2,000 Ar per kilogram, or 600 Ar per tin can
One tin can would be sufficient for a meal for 5–6 people

Dried fish
The price varies, but on average, it costs approximately 4,000 Ar per kilogram
One small fish (150 grams) for a meal may cost 400 Ar

Figure A2. Various fresh greens

Meat
Pork with bones: 6,000 Ar per kilogram
Beef with bones: 5,000 Ar per kilogram
Pork without bones: 7,000 Ar per kilogram

Beef without bones: 6,000 Ar per kilogram

Tripe (beef or pork): 3,400 Ar per kilogram

Eggs
400–500 Ar per egg

Poultry
Chicken: 6,000 Ar per meal for 7–8 people
Duck: 8,000 Ar per meal for 7–8 people
Turkey: 40,000 Ar per meal for 10–15 people
Goose: 30,000 Ar per meal for 10–15 people

Figure A3. Moringa leaves

Figure A4. Tin of dried beans

Figure A5. Fish used to flavor a dish

Annex 5. Barrier Analysis Results Summary Table

Comparison of Doer and Non-Doer FGD groups	Location: Ampasimbe Onibe District		Date of FGD: January 20–22, 2011	
Behavior:	**Determinant #1: Perceived susceptibility**	**Determinant #2: Perceived severity**	**Determinant #3: Perceived action efficacy**	**Determinant #4: Perceived social acceptability**
To what degree is this a barrier? (- to +++++)	++ • Both groups are aware that an inadequate diet (poor quantity) causes anemia and manifests itself as pale palms and eyelids, shortness of breath, fatigue, etc. • They knew of people in their community and families affected by anemia. • Anemia is known as "insufficient blood." • However, neither group knew of the relationship between anemia and malaria.	- Both groups were aware of delivery complications and consequences such as death, for both the mother and infant.	- Both groups understood that their blood could be built up by taking IFA supplements and that it could prevent anemia.	+ • Both groups expressed receiving support from their families and community in taking IFA supplements; however, they expressed lack of support by the CHWs. • The CHWs have a unique opportunity to provide the necessary support to greatly increase compliance and identify women earlier in pregnancy.
Current messages used that confront or work around this barrier/facilitating factor	Brochures used at health centers, health booklets provided by the health centers and CHWs, and other job aids used by the CHWs contain messages about the fight against insufficient blood.	All of the SBCC materials except for the health booklet distributed by the CHWs contain this information.	Brochures used at health centers, health booklets and job aids used by the CHWs contain messages about the fight against insufficient blood by using IFA supplements.	None

Messages that need to be developed or modified concerning this barrier/facilitating factor	• Messages to improve the understanding that malaria can cause anemia. • Messages promoting eating iron-rich foods, while simultaneously eating foods that facilitate iron absorption and reducing inhibitors of iron absorption.	Messages about the complications and consequences of anemia.	None	None
Changes to make in the project design given this barrier/facilitating factor	Update the health booklet with messages listed above.	The health booklet could be a more effective tool if updated with the messages above and distributed by CHWs for women to take them home.	None	• Train CHWs to identify pregnant women before 3 months of pregnancy in order to start their prenatal visits on time. • Encourage CHWs to conduct home visits in order to identify women earlier in pregnancy, remind women about prenatal visits, monitor their IFA consumption, and counsel them on managing side effects of IFA. • Strengthen referral system by the health centers for better monitoring of women by the CHWs. • Encourage

				health center supervision of CHWs.
Sample monitoring indicators	Percentage of pregnant women that have a health booklet provided by the health center or CHWs.	Percentage of pregnant women that have a health booklet provided by the health center or CHWs.	None	• Number of home visits carried out by the CHWs. • Number of CHWs trained.
Comparison of Doer and Non-Doer FGD groups	**Location: Ampasimbe Onibe District**		**Date of FGD: January 20–22, 2011**	
Behavior:	**Determinant #5: Perceived self-efficacy**	**Determinant #6: Cues for action**	**Determinant #7: Perceived divine will**	**Determinant #8: Positive and negative attributes of the preventive action**
To what degree is this a barrier? (- to +++++)	++ • Cost of IFA supplements (300 Ar) is not a problem for pregnant women who routinely go for prenatal care starting at 6 months of pregnancy at the health center. • However, distance to the health center (>10 km walk), plus transportation costs are a barrier, particularly for the months between the prenatal visits. • IFA supplements are available through the CHWs at a lower price (100 Ar).	- The Doers provided examples that could be used as facilitating factors (listed below).	++ • There are no cultural prohibitions or beliefs regarding IFA supplements or other products for the pregnant women. • However, there is a cultural belief that women should hide their pregnancy until they start showing that they are pregnant, typically around 6 months.	+++++ The Non-Doers expressed the following regarding IFA supplements: • Bad taste. • Bad odor. • Side effects (fatigue, stomach ache, dizziness, headache, nausea, and vomiting). Doers shared positive strategies, such as taking it before bed or with lots of water.

Current messages used that confront or work around this barrier/facilitating factor	None	All SBCC materials except for the health booklet provided by the health center contain messages about taking IFA supplements daily for 6 continuous months, even following delivery.	None	Messages regarding managing side effects are mentioned in the job aids used by the CHWs.
Messages that need to be developed or modified concerning this barrier/facilitating factor	• The CHWs can provide IFA supplements at a lower price. • Start prenatal visits at 3 months of pregnancy and obtain IFA supplements from the CHWs during the months between the prenatal visits.	Potential facilitating factors: • Take IFA supplements during a meal. • Put IFA supplements in a visible place (bedside table). • Look in the health booklet for a reminder of when to get the next month's IFA sachet. • Look at the number of IFA tablets remaining in the sachet to remember when to get the next month's supply.	• Start taking IFA supplements before you become pregnant; if not, as soon as you know you are pregnant. • Start prenatal visits at the health center at 3 months of pregnancy.	How to manage the side effects of IFA supplements: • To reduce nausea, vomiting, stomach pain, and constipation, take the IFA supplements during a meal and with lots of water. • When you have black stool, this indicates that the IFA supplements are working. • For other concerns regarding IFA supplements, ask the CHWs or health centers.
Changes to make in the project design given this barrier/facilitating factor	Strengthen the collaboration between the health centers and CHWs in terms of: • Notify the CHWs which women in the	Establish peer support groups between Doers and Non-Doers within villages to exchange best practices and necessary support, to be	• Train CHWs to identify pregnant women before 3 months of pregnancy in order to start their prenatal visits on time.	• Establish peer support groups between Doers and Non-Doers within villages to exchange best practices and necessary support, to be

	community to follow up with after prenatal visits to monitor their IFA intake. • Supervision of CHW activities by the health centers.	carried out once per month on a day of rest.	• Encourage CHWs to conduct home visits in order to identify women earlier in pregnancy and remind women about prenatal visits.	carried out once every month on a day of rest. • Conduct home visits of pregnant women by CHWs.
Sample monitoring indicators	• Number of quarterly meetings between the health centers and CHWs. • Number of pregnant women referred by the health centers to the CHWs.	• Number of peer support groups established. • Number of peer support group meetings held.	• Number of home visits conducted by the CHWs. • Number of CHWs trained.	• Number of peer support groups established. • Number of peer support group meetings held. • Number of home visits conducted by the CHWs.