Distribution Agreement

In presenting this thesis or dissertation as a partial fulfillment of the requirements for an advanced degree from Emory University, I hereby grant to Emory University and its agents the non-exclusive license to archive, make accessible, and display my thesis or dissertation in whole or in part in all forms of media, now or hereafter known, including display on the world wide web. I understand that I may select some access restrictions as part of the online submission of this thesis or dissertation. I retain all ownership rights to the copyright of the thesis or dissertation. I also retain the right to use in future works (such as articles or books) all or part of this thesis or dissertation.

Signature:

_____ _____

Alina Gauntlett Shaw Date

Deconstructing Adherence:
Understanding patient and provider perceptions of iron and folic acid supplements to promote alternative solutions for maternal anemia in Ayacucho, Peru

By

Alina Gauntlett Shaw
Master of Public Health

Hubert Department of Global Health

_____

Amy Webb Girard
Committee Chair

_____

Karen Andes
Committee Member

Deconstructing Adherence:
Understanding patient and provider perceptions of iron and folic acid supplements to promote alternative solutions for maternal anemia in Ayacucho, Peru

By

Alina Gauntlett Shaw

B.A.
Scripps College
2007

Thesis Committee Chair: Amy Webb Girard, PhD

An abstract of
A thesis submitted to the Faculty of the
Rollins School of Public Health of Emory University
in partial fulfillment of the requirements for the degree of
Master of Public Health
in the Hubert Department of Global Health
2012

Abstract

Deconstructing Adherence:
Understanding patient and provider perceptions of iron and folic acid supplements to promote alternative solutions for maternal anemia in Ayacucho, Peru

By Alina Gauntlett Shaw

Background: Anemia is the most common health condition affecting women during pregnancy and leads to adverse health outcomes of both the mother and infant. Women's adherence to iron and folic acid (IFA) supplements in the Peruvian region of Ayacucho remain low despite a government program that provides the tablets for free to pregnant women. Numerous quantitative studies have identified reasons for high discontinuation rates, while qualitative studies on the issue are lacking.

Objective: This study aims to understand the perceptions of patients and providers about the IFA supplementation program in Peru and make recommendations for improvements.

Methods: Twenty-two in-depth interviews and three focus group discussions with participatory learning activities were conducted with women 16 weeks gestation to two months post-partum in urban, semi-urban, and rural communities. Additionally, nine key participant interviews took place with obstetricians and directors of maternal health programs at the hospital and district levels.

Results: Findings indicate that adherence is influenced by six four primary factors: 1) the physical attributes of the tablets including their appearance and smell, associated side effects, and price; 2) the individual characteristics of a woman such as her age, parity, residence in urban or rural community, and the level of partner support she receives; 3) a woman's perceptions of the causes, prevalence, and prevention of anemia; and 4) the counseling or *sensibilización* that the provider conducts during each ANC visit.

Discussion: In order to overcome barriers to supplementation, providers should gain the trust of a patient during her first visit and particularly during her first pregnancy through successful counseling strategies. It is recommended that the Peruvian government adopts social marketing strategies to target these influencing factors. Specifically, addressing the product, price, place, promotion, and policy of IFA supplements may increase women's adherence to the supplementation regimen and reduce iron deficiency maternal anemia.

Deconstructing Adherence:
Understanding patient and provider perceptions of iron and folic acid supplements to promote alternative solutions for maternal anemia in Ayacucho, Peru

By

Alina Gauntlett Shaw

BA
Scripps College
2007

Thesis Committee Chair: Amy Webb Girard, PhD

A thesis submitted to the Faculty of the
Rollins School of Public Health of Emory University
in partial fulfillment of the requirements for the degree of
Master of Public Health
in the Hubert Department of Global Health
2012

Acknowledgements

I would like to extend my sincerest gratitude to my thesis advisor, Aimee Web Girard, for sharing with me her expertise in and boundless passion for anemia and maternal health. Thank you for continually pushing me to be a better student and researcher, and also to find enjoyment in every step of the process. Karen Andes offered direction and balance from start to finish. I could not be more grateful to CARE for the amazing opportunity to work with the organization as an intern for two years. As my "support-a-visor," Lenette Golding planted many seeds of knowledge and guided me through an exceptional learning experience. Carlos Rojas provided endless insight into the Peruvian nutritional context and heartfelt friendship. This research would not have been possible without the support of the *Window* team in Ayacucho, especially Lía García León and Manolo Quispe Campos, for their unceasing patience and instruction. My research was generously funded by CARE USA and the Global Field Experience at Emory University. I am blessed to have such supportive family and friends both near and far, who always believe in me. And lastly, I thank the many mothers and health workers who contributed their time and experience to bringing this research to life.

Table of Contents

List of Tables and Figures

Abbreviations

ANC: Antenatal Care

DHS: Demographic Health Survey

ENDES: *Encuesta Demografica de Salud* (Demographic Health Survey)

FGD: Focus group discussion

GDP: Gross Domestic Product

Hb: Hemoglobin

IDPAS: Iron Deficiency Programme Advisory Board

IFA: Iron and folic acid

INACF: International Nutritional Anemia Consultative Group

INF: International Nutrition Foundation

MDG: Millennium Development Goal

MINSA: *Ministerio de Salud* (Ministry of Health)

NGO: Non-governmental organization

PAHO: Pan American Health Organization

PI: Principal Investigator

PLA: Participatory Learning Activity

RBC: Red blood cell

SIS: *Sistema Integral de Salud* (Integrated Health Insurance System)

SISMED: *Sistema Integrado de Suministros de Medicamentos e Insumos Médicos* (Integrated System of Medication and Medical Consumables Supplies)

UN: United Nations

UNICEF: United Nations Children's Fun

WHO: World Health Organization

Chapter 1: INTRODUCTION

Anemia is the most common health condition experienced by women during pregnancy. The World Health Organization (WHO) estimates that 42% of pregnant women worldwide have anemia (McLean, Cogswell, Egli, Wojdyla, & de Benoist, 2009), amounting to 56 million women (Klemm, Sommerfelt, Boyo, Barba, Kotecha, Steffen, & Franklin, 2011). While several different micronutrient deficiencies contribute to anemia, half of anemia cases are attributed to iron deficiency (McLean et al., 2009). The main risk factors for iron-deficiency anemia among pregnant women are insufficient intake of iron due to inadequate nutrition, poor absorption of iron, and increased iron requirements needed by the growing fetus (Sanghvi, Harvey, & Wainwright, 2010). Women in developing countries are disproportionately affected by anemia since they frequently enter pregnancy with iron stores already depleted from repeated pregnancies without proper spacing and chronic micronutrient deficiencies (Allen, 2000). Poor sanitation and hygiene leading to parasitic infections such as hookworm or malaria, along with acute and chronic infections such as HIV or malaria also lead to anemia.

A woman is considered anemic if she has a hemoglobin concentration < 110 g/L during the first or third trimester of pregnancy, or below 105 g/L during the second trimester (Peña-Rosas & Viteri, 2009). A 55-kg pregnant woman requires 845 mg of iron during her second and third trimesters and none during the first trimester (Gillespie, Kevany, & Mason, 1991). Due to a fetus's development, iron costs on the pregnant mother are highest in the third trimester, increasing from approximately 1-1.5 mg to ≤6 mg per day (Bothwell, 2000; Viteri, 1994). It is difficult for women to meet the iron requirements of a growing fetus by dietary intake alone, especially in settings where iron rich foods are not bioavailable (Gillespie et al. 1991).

Women who are anemic might not be alarmed if they feel fatigued or weak because they consider such symptoms to be normal effects of pregnancy, and so do not seek treatment or adequate prenatal care (Galloway, Dusch, Elder, Achadi, Grajeda, Hurtado, Favin, Kanani, Marsaban, Meda, Moore, Morison, Raina, Rajaratnman, Rodriguez, & Stephen, 2006). While untreated mild or

moderate anemia does not pose an immediate threat to pregnancy, women experience reduced energy and capacity for work which decreases their productivity and ability to care for their family (Galloway et al., 2006; Levin, 1986). This is especially true in the context of low-resource countries, where agricultural work provides the main source of income and food for families. A woman's inability to perform the physical tasks as a subsistence farmer leads her to grow less food, earn less income, and subject her family to higher levels of poverty and food insecurity. However, severe or chronic anemia can cause poor pregnancy and birth outcomes including premature delivery, low birth weight, increased perinatal mortality, and increased risk of death during delivery and postpartum due to hemorrhaging.

Public health workers have several different options for preventing anemia at the population level. In places where people do not have access to iron-rich foods, governments can adopt fortification programs that add iron into commonly consumed products such as flour. Countries have also initiated iron supplementation programs, providing pregnant women with daily iron and folic acid (IFA) tablets. IFA supplementation is not only the most effective ways to prevent anemia during pregnancy, but also one of the most cost-effective public health interventions overall (UNICEF/UNU/WHO/MI Technical Workshop, 1998; Bhutta, Ahmed, Black, Cousens, Dewey, Giugliani, Haider, Kirkwood, Morris, Sachdev, & Shekar, 2008). Discouragingly, even if ministries of health implement iron supplementation or fortification programs, rates of anemia among pregnant women remain high. Developing a better understanding of the barriers and facilitators to effective anemia prevention is necessary to improve these programmatic efforts.

Peru is a prime example of a country that adopted both iron supplementation and fortification programs almost two decades ago, yet 42.7% of Peruvian pregnant women remain anemic (DHS 2011). Women covered by the national healthcare system, or Seguro Integral de Salud (SIS), receive IFA supplements for free from 16 weeks gestation through two months post-partum. However, it is widely known that many women do not complete the entire regimen of IFA supplements—a minimum of 150 tablets, and are thus still at risk of anemia (Munayco, Gambirazio,

Suarez, & Arias, 2009). These unused tablets are thrown out or forgotten under women's beds, wasting the financial and logistical resources that the Peruvian Ministry of Health (MINSA) invests in the national supplementation program.

The region of Ayacucho is located in the highlands of Peru. People living in Ayacucho were cut off from the rest of the country for many years by geographic inaccessibility and political unrest, resulting in a population suffering from extreme poverty without access to basic health services. Since the 1990s, international non-governmental organizations (NGOs) such as UNICEF and CARE have established extensive development programs targeted at improving the economic and health status of the population. As a result of these efforts, the rate of anemia among pregnant women decreased from 19.7% in 2000 to 12.1 in 2010, even though only 50% of women adhere to the prescribed regimen (Munayco et al., 2009).

While epidemiological studies report that pregnant women stop taking IFA supplements due to the bad taste and side effects of the tablets, other factors impacting adherence remain unclear. A more nuanced understanding of the individual and structural factors influencing IFA supplementation among pregnant women in Peru is necessary in order to significantly reduce the prevalence of anemia. This study provides formative qualitative evidence from the viewpoints of both providers and patients about the IFA supplementation program in Ayacucho to gain insight into the strengths and weaknesses of the supplementation program. The following five questions were asked to guide data collection and analysis:

1) What do patients and providers perceive to be the:

    a) Causes of anemia?

    b) Prevalence of anemia in their communities?

    c) Successful prevention strategies of anemia?

2) What are the primary barriers to women's adherence to IFA supplements?

3) What are the primary factors that facilitate women's adherence to IFA supplements?

4) What role does counseling have in IFA supplementation?

5) How can the IFA supplementation program in Ayacucho and throughout Peru be improved?

Along with presenting the current barriers and facilitators to IFA supplementation in Ayacucho, this thesis will consider alternative strategies to increase women's adherence to IFA. The desired outcome is to formulate suggestions for how MINSA can improve their current supplementation program at both the national and regional levels. Developing an insider's view of this system will open up conversation about new ways to approach IFA supplementation. Ultimately, by investing in improvements of the infrastructure that already exists, Peru can more effectively and efficiently reduce anemia among pregnant women.

Chapter 2: LITERATURE REVIEW

2.1 Introduction to Literature Review

The following review of existing literature will cover a range of topics related to iron deficiency anemia, beginning with the global situation of anemia and moving into the specific context of Peru and Ayacucho. First, the etiology and consequences of maternal anemia will be addressed along with an overview of efficacious anemia prevention strategies. Following is an exploration of IFA supplementation, including factors influencing women's adherence to iron supplements, the provider's role in supplementation, and the impact of patient counseling. Next the review will address the prevalence of anemia in Peru and Ayacucho, identifying the primary factors that contribute to these levels and the measures MINSA has put in place to address anemia. A detailed explanation of how Peru's current IFA supplementation program operates will provide insight into the supply chain. Since the program is successful in delivering IFA tablets to pregnant women, key conclusions from previous studies on factors impacting adherence among women in Ayacucho are outlined to identify the research gaps that explain why additional research is needed.

What is anemia?

In Ancient Greek, "Anemia" means "lack of blood." Anemia is a decrease in the normal number of red blood cells (RBCs). This results in a reduction of the normal quantity of hemoglobin (Hb), a protein in the RBCs that transports oxygen from the lungs to tissues throughout the rest of the body by (Klemm et al., 2011). The consequence of anemia is that organs do not get enough oxygen-rich blood, causing damage.

A woman is considered to be anemic when her Hb levels are less than 2 standard deviations of the mean Hb of a healthy population of the same age living at the same altitude (Peña-Rosas et al., 2009). When more than 5% of the population has below average Hb levels, anemia becomes a public health concern (WHO, 2001; Zimmermann & Hurrell, 2007) (see Table 1). The cut off levels that assess severity of anemia are different across the population. For example, pregnant women are

considered anemic when their Hb levels are less than 11.0 g/dL while the cut off for women of reproductive age who are not pregnant is 12.0 g/dL (WHO, 2001) (see Table 1).

Table 1. Severity of anemia and cutoffs in women by pregnancy status and public health significance of anemia by prevalence in population (WHO, 2001; Mathers, Bernard, et al., 2003).

Categories of anemia	*Cutoffs (g/dL) / population*		*Prevalence of anemia (%) by public health significance*
	Pregnant	*Non-pregnant*	
Normal	≥11.0	≥12	≤ 4.9
Mild	10.0 – 10.9	11.0 – 11.9	5-19.9
Moderate	7.0 – 9.9	8.0 – 10.9	20-39.9
Severe	4.0 – 6.9	5.0 – 7.9	≥ 40.0

2.2 Etiology of anemia

The precipitating factors of anemia among pregnant women are multifactorial and often co-occur. Iron deficiency is one of the most common factors contributing to anemia, resulting when the physiological requirements of iron cannot be met the body's absorption of iron from diet alone. This can be due to poor bioavailability of iron-rich foods, especially locations where there is limited access to these foods—such as animal sources of protein, due to geographic or economic reasons. The presence of other vitamin deficiencies contributes to poor absorption of iron, especially vitamin A, riboflavin, folic acid, and B_{12} (WHO & UNICEF 2004).

During adolescence when menstruation begins, women become more susceptible to iron deficiency and anemia. Menstrual iron losses can deplete a woman's iron stores; a 1 mL loss of blood translates to a 0.5 mg loss of iron, meaning that women who experience heavy menses are particularly at risk (Zimmermann & Hurrell, 2007). Use of an intrauterine device (IUD) also contributes to anemia by increasing blood loss during menstruation. Most importantly, when a woman is pregnant she has an increased need for iron to support the growing fetus (Sanghavi et al., 2010). Women need three times as much iron during pregnancy due to expanding maternal RBC mass and growth of the fetal-placental unit. The net pregnancy iron requirement is approximately 1mg/dL, which increases to almost 6.5 mg/dL during the last two trimesters (O'Brien, Zavaleta,

Abrams, & Caulfield, 2003). It is widely accepted that iron deficiency accounts for the largest burden worldwide of anemia in pregnancy (WHO, 2010).

Iron deficiency occurs 2.5 times as frequently as anemia in low-resource countries, though is also common in women and young children in developed countries. For example, in the US, 9-11% of women of reproductive age are iron deficient, while 2-5% of women have iron deficiency anemia though this is almost twice as likely among minority populations (Zimmermann & Hurrell, 2007). Similarly, 18% of women 18-64 in the UK are iron deficient (Zimmermann & Hurrell, 2007).

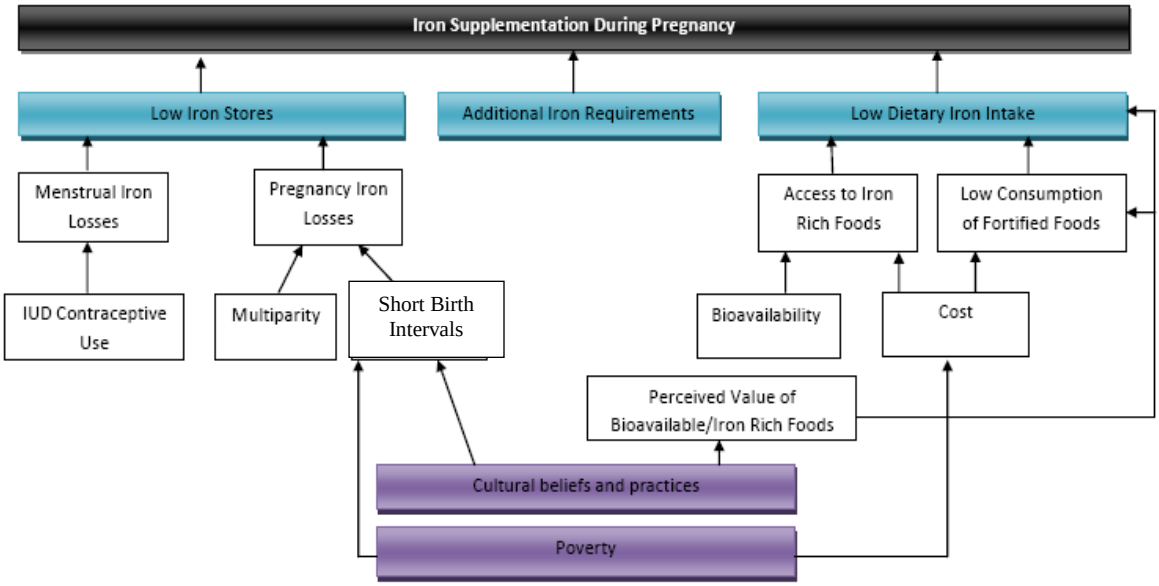
While a large proportion of anemia is caused by iron deficiency, other biological factors can also lead to anemia. Genetic conditions or bone marrow and stem cell problems such as sickle cell anemia, aplastic anemia, or thalassemia prevent the body from producing enough RBCs, and are difficult to prevent (Zimmermann & Hurrell, 2007). Parasites such as hookworms, intestinal worms, and schistosomiasis also contribute to anemia due to intestinal blood loss and nutrient diversion (Sanghavi, Harvey et al. 2010). Hookworm affects more than 700 million people in tropical and subtropical regions; 35% of iron deficiency anemia can be attributed to hookworm in endemic countries (Zimmermann & Hurrell, 2007). Acute and chronic infections such as HIV, malaria, tuberculosis, and hemoglobinopathies causing low RBCs can also aggravate anemia by causing additional RBCs to rupture or decrease further in count.

Specifically in resource-poor settings, poverty and culture can be the underlying cause for anemia by increasing risk of low iron stores due to inadequate dietary intake or increased disease exposure due to poor sanitation (see Figure 1). A woman who is poor is unlikely to space her children with sufficient time to let her body recover from the previous pregnancy and she is also more likely to have more children. Poverty and belief systems also result in a woman's inability to access iron rich foods which might not be valued by her family or culture, leading to chronic micronutrient deficiencies or poor absorption of iron (Allen, 2000).

It is seen here that the causes of anemia and iron deficiency are multifactorial, differ across contexts, and necessitate different strategies for prevention. In the following sections, the

consequences of anemia and the interventions implemented to address anemia will be explored, specifically among pregnant women living in low-resource countries.

Figure 1. Conceptual Framework for Iron Supplementation during Pregnancy (Adapted from Iron Deficiency Programme Advisory Service (IDPAS); the International Nutrition Foundation (INF), 1999; UNICEF/UNU/WHO/MI, 1998)



2.3 Consequences of anemia

It is necessary to situate anemia in the current global political climate surrounding maternal health. Maternal health initiatives play a key role in improving the health status of populations. Recently, maternal heath has received more attention and funding since the United Nations established the Millennium Development Goals (MDGs) in 2000. Goal Five aims to "Improve Maternal Health," with a focus on reducing the maternal mortality ratio by three quarters and achieving universal access to reproductive health (United Nations (UN), 2011). While the MDGs do not specifically target maternal nutrition, researchers and program implementers alike are concentrating efforts on improving micronutrient deficiencies during pregnancy to positively impact many aspects of maternal and child health outcomes that contribute to progress toward the MDGs.

The consequences of maternal anemia extend from the individual level to that of entire countries. A woman who is anemic experiences reduced energy levels and as a result cannot carry out

her physical duties. This means that she has less energy to take on important childcare, household, and other responsibilities to support her family. In low-income countries with food scarcity where close to 70% of women work in agriculture, a high prevalence of anemia may lead to less food grown or income earned, and higher levels of poverty and food insecurity (Klemm et al., 2011). Estimated economic losses due to iron-deficiency anemia alone among all populations are $2.32 per capita or 0.6% of a country's Gross Domestic Product (GDP) (Klemm et al., 2011). When the effects of anemia on reduced cognitive function is also considered, the median total losses approach $16.78 per capita or 4.05% of GDP (Klemm et al., 2011). For example, in Bolivia the economic consequences of iron deficiency anemia are estimated to reduce GDP by 3.9%, while in Bangladesh GDP losses are estimated at 7.9% (Horton & Ross, 2003).

During gestation, a fetus stores approximately 250 mg of iron since infants do not receive enough iron through breast milk alone (Zimmermann & Hurrell, 2007). Maternal anemia is associated with an increased risk of low birth weight, pre-term birth, infant and child mortality, and iron deficiency in infants after four months of age, limiting a child's ability to reach their full physical and cognitive development potential (Christian, Khatry, Katz, Pradhan, LeClerq, Shrestha, et al. 2003; Miller, Stoltzfus, Mbuya, Malaba, Iliff, & Humphrey, et al., 2003; Titaley, Dibley, Roberts, & Agho, 2010; Zeng, Dibley, Cheng, Dang, Chang, Kong, et al., 2001).

Anemia during pregnancy may increase a woman's risk of mortality, though the epidemiological data are conflicting. Some studies estimate that 20% of maternal mortalities are directly related to anemia and up to 50% are associated with anemia (Gillspie et al., 1991). Brabin et al. (2001) calculate that 3% of maternal deaths in Latin America are attributed to anemia. Rush (2000) found that the risk of maternal mortality is greatly increased with severe anemia, possibly attributed to hemorrhage and obstructed labor. A community-based randomized trial in Zanzibar showed that moderate-severe anemia (Hb <9.0 g/L) at enrollment was strongly associated with blood loss at delivery and the postpartum period, putting women at an increased risk of death (Kavle et al. 2008). Additional population-based models estimate that every 1.0 g/dL increase in Hb among pregnant

women decreases the risk of mortality by 20% (Stoltzfus, Mullany, & Black, 2004), amounting to 115,000 maternal deaths averted each year (Klemm et al., 2011).

The reliability of these findings is questionable due to an absence of universally accepted standards for attributing death to anemia, and because the studies have many methodological limitations. Nonetheless, preventing anemia during pregnancy is an important strategy for reducing maternal deaths and implementation of interventions to prevent iron deficiency anemia during pregnancy is an important way to reduce maternal mortality and make gains toward reaching MDG Five (Peña-Rosas et al., 2009).

2.4 Efficacious and effective strategies for anemia prevention

The implementation of anemia preventative programs, namely iron and folic acid supplementation and iron fortification, have the highest cost-benefit ratios compared to almost any other public health intervention (UNICEF/UNU/WHO/MI Technical Workshop, 1998; Bhutta, Ahmed, Black, Cousens, Dewey, Giugliani, Haider, Kirkwood, Morris, Sachdev, & Shekar, 2008). Horton and Ross (2003) conservatively estimate that iron therapy in anemic adults is associated with a 5% increase in productivity among those in lower socioeconomic classes and 17% for people who earn income through manual labor.

Due to the multifactorial etiology of anemia, interventions to prevent anemia vary from reducing micronutrient malnutrition among vulnerable populations through food fortification and dietary diversification, to parasite control and iron supplementation. The first two approaches addressing diet are most successful in providing long-term control of micronutrient deficiencies (Sacco, Caufield, Zavaleta, & Retamozo, 2003). However, while fortification is an important step in reducing chronic iron deficiency and anemia among women of reproductive age, it does not provide sufficient iron intake to meet the demands of pregnancy. It is also difficult to monitor the efficacy of increased iron intake from iron-fortified food in improving iron status due to reliance on participants' dietary recall. However, a comprehensive study by Hurrell et al. (2010) evaluated the

efficacy of flour fortification programs in 78 countries and found that the majority were ineffective due to low consumption and low-bioavailability of the iron.

Iron supplements have been shown to be the most efficacious short-term strategy for improving a woman's ability to overcome iron deficiency, especially during pregnancy. The WHO recommends providing daily supplementation with 60 mg iron and 400 μg folic acid (IFA) to women for six months during pregnancy and the first 3 months postpartum (WHO, 2009). The benefits of iron supplementation during pregnancy can lead to better health outcomes for both mother and baby (Peña-Rosas, 2009). A recent study among pregnant rural Chinese women comparing supplementation with IFA to folic acid alone showed a 54% reduction in neonatal mortality among women who took the combination with iron (Zeng et al., 2001). Another trial in Nepal demonstrated a 16% reduction in low birth weight of babies (<2500g) among women who receive IFA early in pregnancy (Christian, 2009).

The ministries of health in developing countries commonly implement IFA supplementation in national nutrition or maternal health programs to reduce iron deficiency among their populations. Even though many countries, such as Peru, have adopted national supplementation programs for pregnant women, women continue to suffer from anemia. This can be attributed to the difference between the efficacy and effectiveness of IFA supplementation programs. While an efficacious intervention can produce a beneficial biological effect under ideal conditions, an effective intervention has the intended effect on a defined population. The main difference between the two is that effectiveness takes into account compliance, as determined by behavioral factors that can differ between groups and settings. As the International Nutritional Anemia Consultative Group (INACG) notes (2004): "even if an efficacious intervention is implemented, its *effectiveness* and cost-benefit will be limited if the program is not properly implemented… programs need to be evaluated in different settings" (p. 5). For this reason, large-scale iron supplementation programs have generally not been effective and can largely be attributed to the behavior of the target population—specifically pregnant women's adherence to the supplementation regimen (INACG, 2004).

2.5 Adherence to iron supplements

A provider expects that a patient taking iron supplements will experience an increase in Hb, hematocrit, and serum ferritin levels. If these changes do not occur, the provider might assume that the patient is not complying with the prescribed regimen (Galloway & McGuire, 2004). Low adherence is associated with a range of factors, including: 1) gastrointestinal side-effects of the supplements; 2) inadequate supply of tablets (including limited economic resources to purchase tablets); 3) limited access to health services and late entry into antenatal care (ANC); 4) low motivation of health personnel resulting in inadequate counseling of patients by health care providers on the importance, possible side effects, and instructions for how to take the tablets; and 5) community beliefs, attitudes and practices shaping women's perception of anemia, resulting in low patient motivation to adhere to supplementation (Seck & Jackson, 2007; Zavaleta, Caulfield, & Garcia, 2000; Galloway & McGuire, 1994; Galloway et al. 2006).

As Galloway and McGuire (1994) note, although motivational factors are commonly overlooked, they are especially important since anemia is not a "dramatic" illness and the changes in health from adherence to supplementation regimens that most patients experience are subtle. Also, the benefits from iron supplementation noticeably effect health after a long period of time, so women might discontinue taking their tablets long before the regimen has a positive impact. This is especially true if provider tell patients that they will experience an increase in energy or strength and then women do not experience a change in health after several weeks. Conversely, if a woman is severely anemic, she might think of herself as cured her health improves to a noticeable level and stop taking the supplements.

MotherCare Project, directed by Galloway et al. (2006), conducted an eight-country study which found that, contrary to the belief that negative side effects primarily cause women to stop taking iron tablets during pregnancy, only about one-third of the participants reported experiencing adverse physical effects caused by the tablets. Instead, results indicated that the major barrier to effective supplementation programs in participating countries was inadequate supply. Galloway and

McGuire (1994) carried out a literature review showing that the proportion of women across studies in many different countries who stop taking iron supplements due to side effects is less than 10%.

Adherence can be measured by direct and indirect means. While more costly, direct measures of Hb or hematocrit are common to detect physiologic change in a patient. This is often intrusive and can affect the overall treatment program, while also being difficult to carry out under the financial constraints of resource-poor countries. Indirect measures of adherence involve observation or supervision of a patient by the health care provider while she takes the tablet; patient self-reporting; and counting the number of tablets used out of a "blister" package (Galloway & McGuire, 1994). Self-reporting is not very accurate due to over-reporting, while tablet counts do not necessarily equal number of tablets consumed. Norell (1981) found that although only 4% of women reported not taking all their tablets, monitor records indicated that one third of women had missed two or more doses. For this reason, it is difficult for health providers to know the true adherence rate of their patients without ordering blood tests.

2.6 Role of providers in supplementation

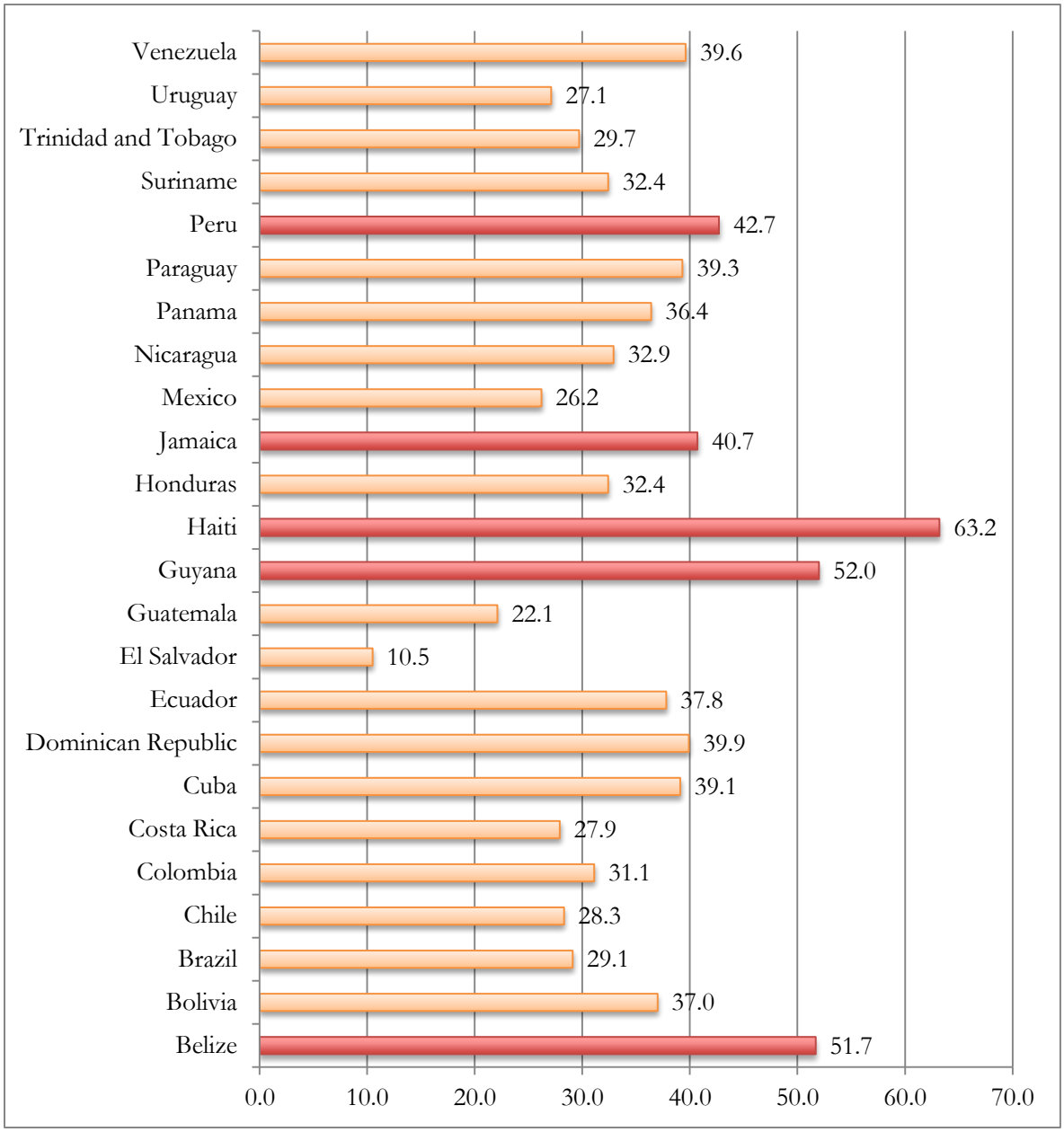
The role of the health care provider is crucial in the process of supplementation, and especially for influencing a pregnant woman's adherence to the supplementation regimen. Patient involvement, the clarity of the message, and message delivery are all important factors for improving patient-provider dynamics (Galloway & McGuire, 1994). Hayes-Bautista (1976) found that if a patient and health care provider work together to devise a treatment plan, then the regimen is more likely to be followed but unfortunately does not commonly take place.

In order for providers to successfully counsel their patients in anemia prevention, they must first understand the behavioral factors influencing a woman's adherence. As Fishbein and Cappella (2006) state, when theories of behavioral prediction and behavior change are properly applied, they allow us to identify salient beliefs underlying a person's intention to perform (or not perform) a given behavior. These beliefs can serve as the targets for persuasive communication through an intervention. Public health officials must understand the beliefs affecting patient adherence to

supplementation regimens if they hope to improve women's iron levels through IFA supplementation.

Studies to evaluate interventions to improve women's adherence to IFA supplements indicate that patient education is extremely important. Adhikari, Liabsuetrakul and Pradhan found that education and education with pill counting increased Hb levels (0.23 and 0.26 g/dL, respectively) and decreased anemia by 59% and 6%, respectively, among women in Nepal. Other studies show that simple, positive educational measures and improved individual counseling of women can increase Hb levels as well as nutritional status during pregnancy (Senanayake, Premaratne, Palihawadana, & Wijeratne, 2010; Garg & Kashyap, 2006). A meta-analysis conducted by Olude (2011) showed that nutritional education and counseling provided to pregnant women significantly reduced anemia by 30% compared to control groups (RR=0.70 CI: 0.58-0.84), and that it was most effective when delivered along with nutrition support such as IFA. This can be attributed to the fact that diet alone is not sufficient to meet the increased demands of pregnancy, especially in places where access to adequate nutrition (quantity and quality) is limited. Given that educational activities were more effective in reducing the risk of anemia in low to middle-income countries than in high income countries, counseling is a promising strategy for improving IFA adherence in settings such as Peru.

Figure 2. Proportion of pregnant women with anemia (% Hb<11 g/dL) in Latin America and the Caribbean (McLean et al., 2009)



2.7 Iron Deficiency in Peru and Ayacucho

Latin American countries are working diligently to meet the MDGs and as a result have made great progress improving maternal health, especially in micronutrient deficiencies. Most of the Latin America and Caribbean region has reduced the burden of anemia to moderate levels among vulnerable populations due to a push by the Pan American Health Organization (PAHO) to recognize and address iron deficiency (Friere 2009) and implementation of iron fortification and supplementation programs. Despite pressures from PAHO and efforts to improve health

infrastructure, Peru has consistently been one of only two countries in South America reporting anemia as a severe public health problem among pregnant women (see Figure 2, red bars indicate severe anemia).

In 2009, 21.5% of Peruvian women of reproductive age were anemic (ENDES 2010), compared to 31.6% in 2000. The majority (18.1%) of the women sampled had mild anemia, 2.7% had moderate anemia and 0.2% demonstrated severe anemia. Of women who were pregnant, 32.6% were anemic, while 26.7% of lactating women had anemia. Older women between 40 and 49 years of age had the highest prevalence of anemia (23.1%) compared to women < 40. The largest prevalence of anemia was found among women using an IUD (31.8%), although only 2.5% of all women of reproductive age reported currently using an IUD. Pregnant women were the next largest cohort of anemic women (26.6%), followed by lactating women (24.5%), and women with no formal education (25.1%). Rural women were affected by anemia more than women living in urban locations (24.9% compared to 20.3%), while women living in the Andes had a prevalence of 22.4%. In 2010, 12.1% of women in Ayacucho were anemic, a decrease from 16.6% in 2009 and from 19.7% in 2000—making anemia a mild public health problem in the region. This can be attributed to the fact that many NGOs have been working diligently throughout the region to reduce malnutrition and other factors contributing to anemia since the early 1990s. All measurements were adjusted for altitude.

As in other countries, the etiology of anemia in Peru is multifactorial and inextricably related to the geographic and socioeconomic characteristics of the country. As Figure 3 demonstrates, poverty and environment—specifically altitude, contribute to a woman's intake of bioavailable iron. Long-term residency at an elevation of 3,000 feet causes a generalized upward shift in hemoglobin count given that atmospheric pressure affects oxygen content. While malaria is endemic in the Amazon districts of Peru, it is not a contributing factor to anemia in the *sierra* or mountain regions. A second influencer is lack of access to safe water and poor sanitation; only 55.7% of households have a flushing toilet connected to running water (ENDES 2010). This leads to an increased prevalence of infectious diseases such as hookworm that increase a woman's risk for anemia. Lastly, mineral and

micronutrient deficiencies are significant public health concerns in Peru due to inadequate dietary intake (O'Brien et al. 2003).

2.8 Effectiveness of Peruvian strategies to address anemia

In 1999, Peruvian government adopted an iron fortification program of wheat flour products with 30 mg ferrous sulfate per kg of flour, resulting in a decrease of anemia prevalence among Peruvian women of reproductive age decreased from 31.6% to 21.0% between 2000 and 2009. A pregnant woman should consume 10.9 kg of fortified flour to meet an iron intake of 55 μg/kg (López de Romaña, Salazar, Hambidge, Penny, Peerson, Krebs, Brown, 2005). However, Sacco et al. (2003) found that 93% of pregnant women living in a shantytown south of Lima had inadequate dietary iron intake, despite 97% responding that they had consumed products made with fortified flour the previous day (as an estimate for daily intake). Furthermore, iron intake was minimally consumed in animal sources and mostly consumed in the form of hard to absorb sources such as legumes and grains (Sacco et al. 2003). This indicates that women in Peru are not receiving the iron they need from dietary sources, necessitating the supplementation with IFA during pregnancy.

Since 1998, MINSA's maternal healthcare package has required that all providers who care for women within the Sistema Integral de Salud (SIS) provide them with supplements containing the WHO-recommended 60mg of iron and 400ug of folic acid from 16 weeks gestation to two months post-partum, free of charge. When women attend an ANC visit, their provider writes them a prescription for one blister holding 30 IFA tablets that is supposed to last them one month. The prescription can be filled at the pharmacy located within the health establishment. This assumes that women will come to a clinic for her IFA every 30 days and that the clinic has the full dosage in stock, which is not always the case. DHS estimates from 2010 indicate that 84.5% of women in Peru received IFA supplements during pregnancy, compared to 88.7% of women in Ayacucho.

SISMED (Sistema Integrado de Suministros de Medicamentos e Insumos Médicos) is the department within MINSA responsible for the procurement and distribution of medications

(http://www.sismed.minsa.gob.pe/). They contract several different domestic pharmaceutical companies to produce the tablets, depending on price negotiations and yearly demand. In order to make the tablets as cost-effective as possible, they are produced using a generic format. SISMED has established intermediate medication supply stores throughout Peru's 25 political regions that receive shipments of medications from the pharmaceutical companies and carry a large amount of stock. Every three months, the health establishments submit a requisition form to SISMED with their projected pharmaceutical needs, and the intermediate supply stores distribute the requested stock. Figure 4 details the IFA supply chain from the manufacturer to the patient, and shows the different intermediate levels of warehousing and transportation involved in the supplementation program.

Figure 3. Primary factors contributing to maternal anemia in Peru
(adapted from problem tree created by the anemia working group in Ayacucho, July 2011)

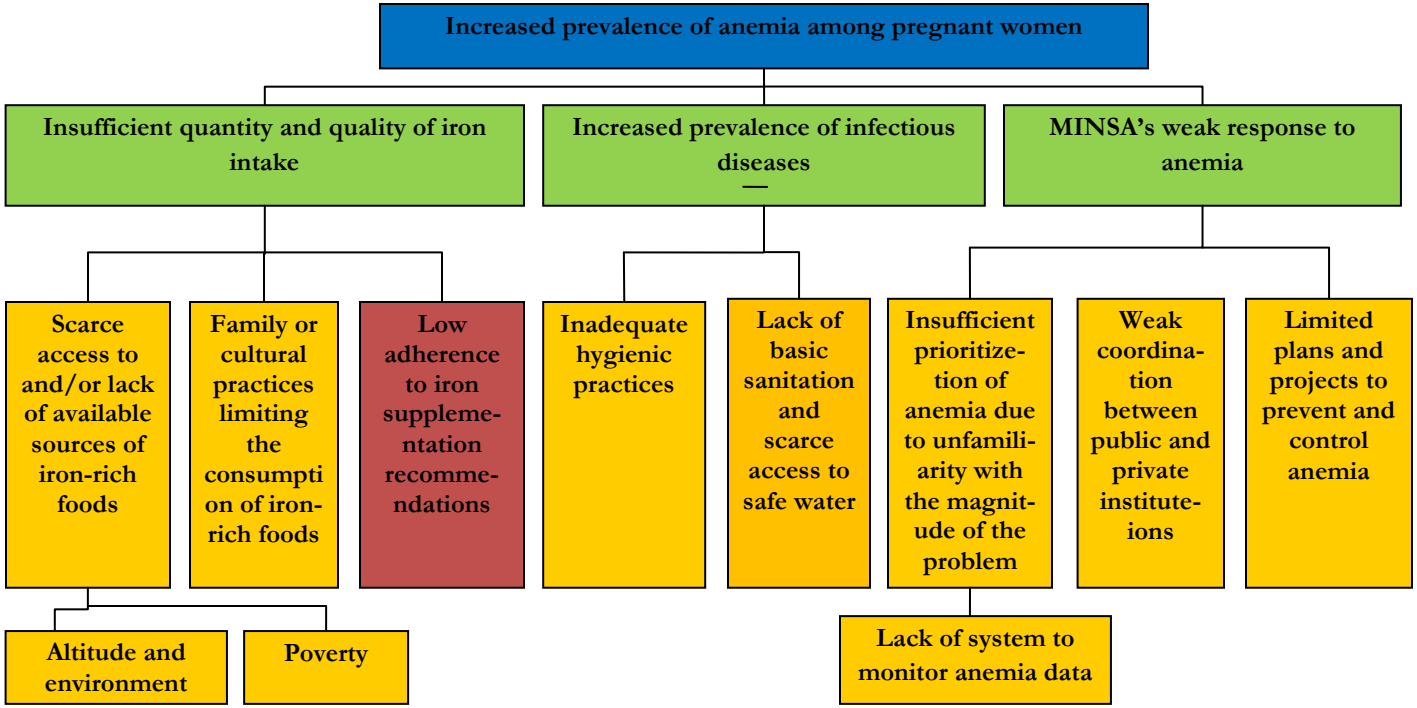
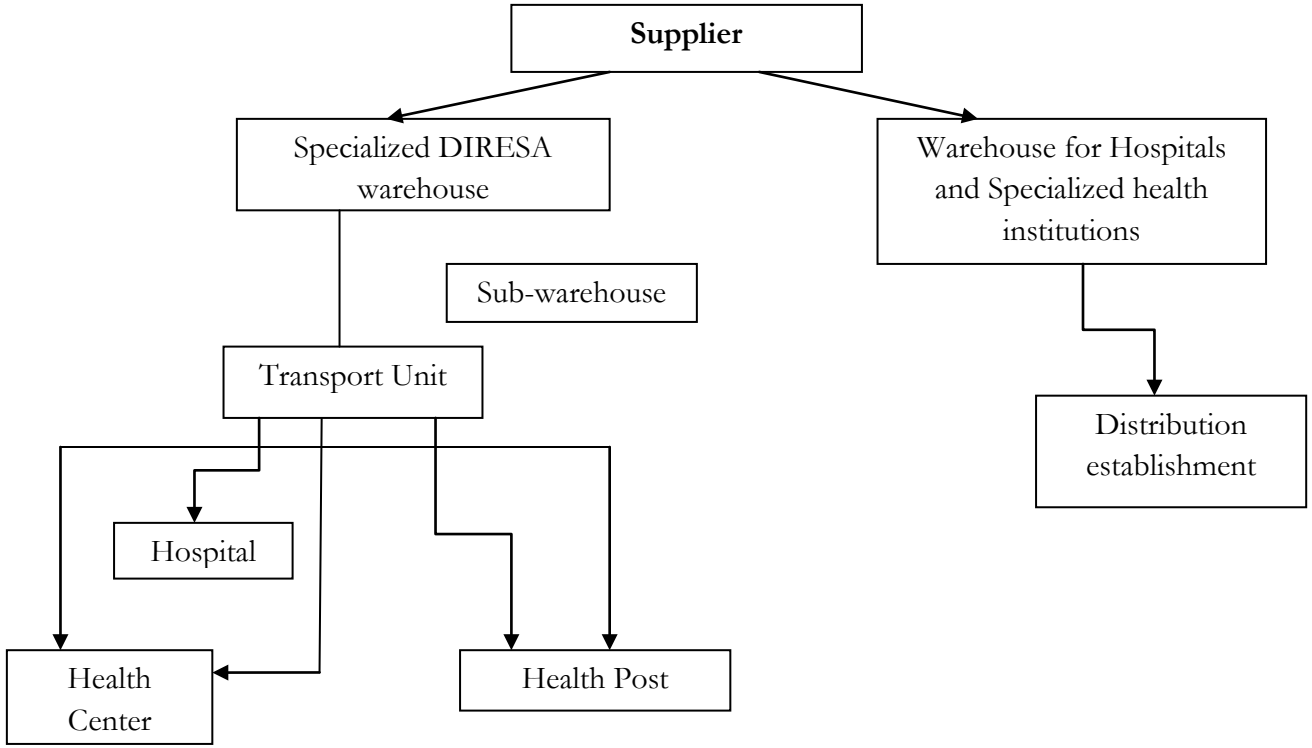


Figure 4. Flow chart of IFA supply chain, from manufacturer to patient (SISMED)



DHS data show that 97.6% of Peruvian women receive ANC from a trained medical provider (ENDES 2010). Discrepancies, apparent by region, reflect accessibility of clinics and care. In rural areas, 87.1% of women receive ANC compared with 97.9% of women living in an urban location. In Ayacucho, 96.6% of women are attended to by a trained provider—the highest proportion of any region in Peru, and the majority are seen by an obstetrician (72.0%). Most Peruvian women receive their first visit before four months of pregnancy (73.0%), and 92.9% of women attend at least four visits before delivery. Of recent live births in Ayacucho, 7.5% of the infants weighed less than 2500g.

2.9 Adherence to IFA supplements in Peru

While supply is not a frequent barrier to IFA supplementation, pregnant women still face other difficulties during adherence. DHS data indicate that while most pregnant women start off taking IFA supplements, few women complete the entire regimen while the smallest proportion of women take their tablets between 60 and 90 days (see Table 2). Only 22.4% of women with six or more children take IFA, followed by those without a primary education (23.3%) and women living in rural areas (25.3%).

Table 2. Percent distribution of women by number of days taking IFA supplement during pregnancy in 2011(ENDES 2010)

	Total	*<60*	*60-89*	*90+*
Rural	81.1	39.6	11.4	28.7
Sierra	81.7	40.1	11.1	29.0
Ayacucho	88.7	39.1	11.7	37.9
Peru Total	84.5	36.0	12.7	35.4

In 2009, the Epidemiology Department of Peru and UNICEF conducted a study in Ayacucho and Apurimac evaluating the adherence of pregnant women to the iron supplementation program (see Tables 3 and 4). Investigators defined adherence as the number of tablets given out – calculated as number of tablets left over in the blisters x 100 divided by the number of days between when the blisters were handed out and returned (Munayco, Gambirazio, Suarez, & Arias, 2009). They found that median adherence among studied women was less than 50% and decreased as length of

gestation increased until it was only 30% in the sixth month (Munayco et al., 2009). The most common side effect that women reported was the bad taste of the supplement (30%), followed by nausea (23 %). While 46% of women reported no side effects from IFA during their previous pregnancy, half reported experiencing between one and three side effects. During the first and second ANC visits, one side effect was shown to increase adherence. However, if two side effects were experienced by the second visit then adherence decreased. Similarly, third and fourth visits three or more side effects also decreased adherence. Since the third visit seems to be the tipping point for adherence, this study shows that efforts should be focused at around 24 weeks gestation when this visit would occur.

Table 3. Pregnant women's experience with supplements, Ayacucho (Munayco 2009)

	n	**Percent**
IFA consumption during the previous pregnancy	118	81.94
Reported side-effects of IFA supplement		
Nausea	42	23.08
Vomiting	19	10.44
Gastritis	5	2.75
Abdominal pain	11	6.04
Acidity	9	4.95
Constipation	4	2.20
Diarrhea	4	1.42
Lack of appetite	18	9.89
Increase in appetite	0	0.00
Bad taste	54	29.67
Trouble sleeping	19	10.44
Discoloration of teeth	0	0.00
Headache	0	0.00
Dizziness	0	0.00
Number of side effects caused by IFA reported during previous pregnancy		
None	54	45.76
1	23	19.49
2-3	36	30.51
4 or more	5	4.24

Table 4. Risk factors for low adherence to IFA supplements in Ayacucho and Apurimac (Munayco 2009)

Factors related to low adherence	Follow-up visits					
	First OR (95% CI)	**Second** OR (95% CI)	**Third** OR (95% CI)	**Fourth** OR (95% CI)	**Fifth** OR (95% CI)	**Sixth** OR (95% CI)
Number of side effects experienced						
1	0.51 (0.29-0.91)	0.54 (0.30-0.99)	0.81 (0.42-1.56)	0.84 (0.43-1.61)	0.43 (0.16-1.15)	0.71 (0.13-4.00)
2	0.71 (0.39-1.30)	1.46 (0.76-2.78)	2.63 (1.26-5.49)	0.90 (0.35-2.27)	0.37 (0.12-1.25)	
3	1.53 (0.76-3.06)	1.75 (0.73-4.18)	3.61 (1.15-11.36)	13.81 (1.62-117.54)		
4 or more	6.16 (1.64-23.07)	4.37 (1.00-19.05)	12.63 (1.28-124.82)			
Other factors contributing to low adherence						
Lack of motivation to continue	1.26 (0.74-2.16)	3.46 (2.08-5.77)	3.27 (1.90-5.65)	1.98 (1.12-3.50)	1.03 (0.50-2.12)	0.07 (0.01-0.68)
Does not like supplement	0.61 (0.38-0.98)	1.05 (0.66-1.68)	1.63 (0.98-2.72)	1.28 (0.74-2.22)	0.54 (0.24-1.21)	1.03 (0.16-6.62)
Did not receive supplement from health establishment	3.35 (1.09-10.34)	23.83 (3.01-188.56)	7.74 (2.44-24.57)	9.17 (3.20-26.29)	17.05 (3.87-75.19)	20.00 (0.93-429.87)
Inadequate counseling	0.56 (0.32-0.97)	1.35 (0.76-2.39)	2.45 (1.31-4.57)	0.99 (0.57-1.71)	1.11 (0.53-2.31)	0.62 (0.13-3.06)

Not receiving IFA from the health establishment was strongly associated with low adherence in Ayacucho and Apurimac across all time points. Furthermore, the data indicate that the risk of low adherence was related to the side effects of the supplement tablet, a lack of motivation to continue taking the supplement, and inadequate counseling about supplementation. Further qualitative research is needed to address the causes of anemia in this population to determine whether IFA alone could reduce anemia.

2.10 Filling the research gaps

The literature reviewed in this chapter provides ample evidence the importance of IFA supplementation to prevent anemia as well as the context in which supplementation is taking place in Ayacucho, Peru. As the quantitative results from the Munayco study indicate, women's adherence to IFA supplements during pregnancy remains low. The objective of this formative study is thus to contribute qualitative findings on the individual and structural factors that influence supplementation. By elucidating the experience of providers and patients, this research explores a comprehensive understanding of why women do not adhere to the IFA regimen to formulate suggestions for how MINSA can improve Peru's IFA supplementation program.

Chapter 3: METHODS

This chapter describes the overall approach used to design, collect, and analyze data during this formative study. First, a description of the historical and geographic context is given, followed by an explanation of the study participants and sampling procedures including recruitment. Next the development of data collection tools and procedures is described, and the process used for data processing. The section concludes with a brief description of the study's limitations.

3.1 Study Design

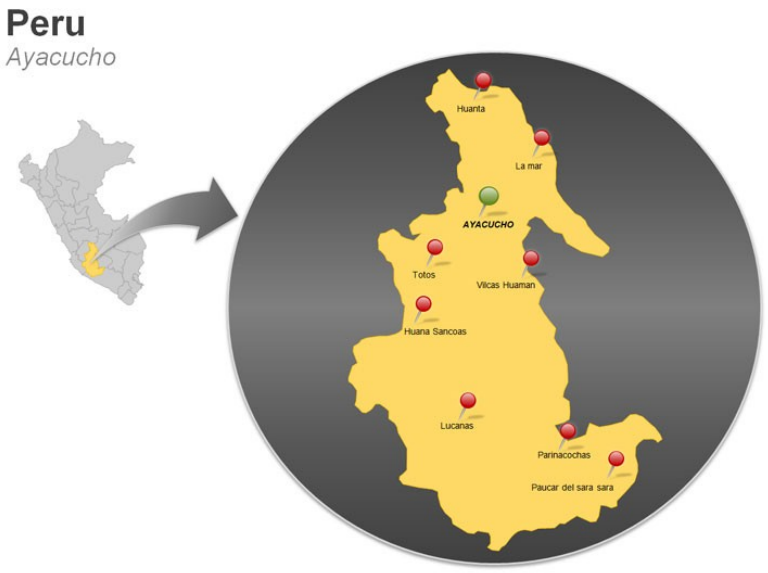
Data collection occurred in June and July 2011 in the district of Ayacucho, Peru. Study locations included the rural community of Tambillo, the peri-urban community of Luricocha, and the urban center of Huanta. This study used qualitative methods in order to provide detailed insight into perceptions surrounding anemia as well as the reasons the barriers and facilitators to IFA supplementation. In-depth interviews were conducted with providers and patients, while focus group discussions (FGDs) and participatory learning activities (PLAs) were conducted with patients only. These methods allowed participants to expand on their experience with the IFA supplementation program in so that results directly reflect their personal opinions or, in the case of the PLAs, data was generated directly by participants.

3.2 Study Sites

The region of Ayacucho is geographically and ethnically diverse, ranging from arid *altiplano* and indigenous communities to lush lowlands with urbanized centers. Towns and communities are isolated from the rest of the country by the geographic barrier of the Andes and poorly maintained mountain roads (see Figure 5). This has hindered the region's social and economic development, along with its tumultuous history. During the 80s and 90s, Ayacucho was the central base of operation for the Shining Path terrorist group. When the guerrillas were defeated and the government gained control over the region, international NGOs flooded the district with the aim of

rebuilding the social sector and bringing much-needed aid to the people. Today a strong NGO presence is still visible in Ayacucho, where they operate programs ranging from food security and fortification of potatoes to microfinance groups. However, literacy rates and health status remain much lower in Ayacucho than in other regions.

Figure 5. Map of the Ayacucho region, Peru[1]



In order to accurately represent the different demographic characteristics of Ayacucho's population, data was collected in three different sites: Tambillo, Luricocha, and Huanta. This allowed for representation of the rural, peri-urban, and urban populations, respectively. These locations were chosen because they each contained at least 15 pregnant women and were accessible to the principal investigator both in terms of local transportation and relative proximity to the city of Ayacucho.

Huanta, an urban center, has a population of approximately 16,050 people living in a lush valley at an altitude of 2,500 meters. The public hospital in Huanta attends close to 300 pregnant

[1] Source: http://www.google.com/imgres?um=1&hl=en&sa=N&biw=1280&bih=677&tbm=isch&tbnid=I7LIf4y2sZTX7M:&imgrefurl=http://www.24point0.com/ppt-shop/editable-ppt-maps/editable-ppt-maps-peru&docid=uO-rL_uQhTxsbM&imgurl=http://www.24point0.com/ppt-shop/media/catalog/product/cache/1/image/9df78eab33525d08d6e5fb8d27136e95/a/y/ayacucho-map-of-peru-powerpoint-presentations.jpg&w=750&h=563&ei=md-KT9XeD7GA2QWd4qTWCQ&zoom=1&iact=hc&vpx=980&vpy=353&dur=2&hovh=194&hovw=259&tx=153&ty=131&sig=102650089210944647812&page=3&tbnh=142&tbnw=189&start=43&ndsp=23&ved=1t:429,r:16,s:43,i:246

women who travel from towns up to 6 hours away to seek care. Families living in Huanta have access to economic resources and diverse foods given that it is close to the district capital of Ayacucho and also serves as an economic hub for the various rural towns nearby.

Fifteen kilometers to the northwest is the peri-urban town of Luricocha with a population 6,000. The altitude in Luricocha is similar to that of Huanta, lending to a temperate climate. Luricocha is known for its production of exported agricultural products, and due to the labor demands of different crops, the population ebbs and flows with seasonal migration. Women here seek prenatal care from the local health center, but usually travel to the nearby hospital in Huanta for their deliveries.

Most of the 5,000 people in rural Tambillo live at an altitude above 3,000 meters. As a result, the cold and dry landscape limits agricultural cultivation to several select carbohydrate-rich crops such as potatoes and corn. However, Tambillo's proximity to Ayacucho means that products and services are interchanged daily. People have access to one rural health post in Ccechcca and one health center located on the outskirts of Ayacucho that serves people from the surrounding rural communities. The majority of the population speaks Quechua, and the younger generations are also fluent in Spanish.

3.3 Study Population and Sampling

During this study the principal investigator (PI) collaborated with CARE Peru's regional office in Ayacucho on the Window of Opportunity (Window) program that aims to improve infant and young child feeding and related maternal nutrition practices. Window staff are highly respected in the communities, and introduced the PI to key contacts as a colleague. Working through CARE Peru allowed the PI to enter into remote communities and immediately gain their trust, facilitating quick data collection. Given that many other international NGOs such as UNICEF and Feed the Hungry also work closely with the communities in Ayacucho, most people in the region are accustomed to not only interacting with field staff but also participating in research studies and were thus willing to be interviewed or participate in the focus groups.

Study participants included women in three different age groups identified by the Peruvian government as the main reproductive stages of a woman's life: adolescents between 15 and 17, young adults between 18 and 29, and adults between 30 and 59. At least one woman from each age group was interviewed per site to gain insight into differences in experience with IFA depending on women's age (see Table 5). No age requirements were made when recruiting for FGDs. Ages of the participants ranged from 15 to 38, and 3 months gestation to 2 months postpartum. Both nulliparous and multiparous women were included. All adolescents interviewed were pregnant with their first child. In order to fit eligibility criteria, women had to be at least 15 weeks pregnant and less than two months postpartum, though an exception was made for two women from Tambillo who had babies up to six months old due to recruitment difficulties. Participants were also required to be enrolled in the government healthcare program (SIS), and have attended at least ANC visit and taken IFA supplements before participation. The partners of three women meeting inclusion criteria were also interviewed in Huanta and Luricocha to determine their perception of anemia and iron supplementation. This data allowed the investigator was able to glean a better understanding of how the family members close to pregnant women influence their attitudes toward and practices associated with iron consumption, both in the form of tablets and food sources.

Most pregnant women and their partners were purposively selected at health clinics. They were approached directly by the PI in the waiting rooms of health institutions before or after their ANC visit and asked to participate in the study. Three participants from Huanta and one participant in Tambillo were recruited through snowball sampling. These women were located at their homes using a list compiled by an obstetrician when the PI accompanied a local nurse as she made house visits. Recruitment for the focus groups was conducted by a local authority such as the community president or the nutritionist, who asked participants to meet at a given location at a certain time.

Table 5. Methodology for data collection				
	Tambillo	*Luricocha*	*Huanta*	*District*
Focus Group Discussion with pregnant women and mothers of children <6 months	1	1	1	
In Depth Interviews				
Adolescent mothers Age 15-17 (gestation length, parity)	1 (3 weeks post-partum, first)	2 (36 weeks, first),	1 (8 months, first)	
Young adult mothers Age 18-29 (gestation length, parity)	2 (9 months, first) (9 months, second)	2 (22 weeks, second) (6 months, first)	4 (3 months, multiparous) (8 months, first) (8 months, 3 weeks, first) (8, 9 months, multiparous)	
Adult mothers 30+ (gestation length, parity)	1 (5 weeks, 8th)	1 (11 weeks, multiparous)	1 (4 months, multiparous)	
Husbands	1	2		
Obstetricians	1	1	1	
Key informants from government health programs[2]				7
TOTAL	6	5	7	7

One obstetrician in each study site was identified and contacted by CARE staff through pre-existing relationships, then interviewed by the PI to elucidate the experience of the providers who prescribes and monitors women's IFA supplementation during pregnancy. Six representatives of the maternal health strategy at the regional health directorate (DIRESA: Dirección Regional de Salud) were also interviewed, along with the director of maternal health at the headquarters of the regional public health insurance network. This provided insight into the goals of the maternal programs, as well as the structural operation of the IFA supplementation program. In order to interview personnel at the regional governmental departments, the PI conducted cold calls, going to their offices and either interviewing the participants on the spot or arranging a meeting at a future time to return for data collection. Understanding of the IFA supply chain was gained through an interview with a key informant at SISMED (Sistema de insumos de medicamentos). A full breakdown of participant characteristics can be found in Table 5.

[2] Includes DIRESA, SISMED and public insurance network

3.4 Data Collection Tools

Because research on IFA supplementation has previously been conducted in other contexts, the PI used validated research instruments so as not to reinvent the work that other researchers have already undertaken. For this reason, interview and FGD guides were adapted from those used in the study "Women's perceptions of iron deficiency and anemia prevention and control in eight developing countries" (Galloway et al. 2006). Rae Galloway, the primary author, was kind enough to share her guides used for data collection in Indonesia with the PI. Questions were translated into Spanish and adapted to the cultural context of Ayacucho with the help of CARE Peru staff. Interview guides were continually adapted to answer the research questions throughout the data collection process as the PI developed a deeper understanding of the study context. The FGD guide was piloted in the urban community with six pregnant women before collecting data used for analysis.

Participatory learning activities (PLAs) conducted during the focus group discussions were chosen through the manual *Tools Together Now* (Alliance, I. H. A. (2006). The first PLA was a free-listing exercise to collect information on the foods that women eat during pregnancy and the frequency with which they are consumed. The second was a problem tree activity exploring the root causes, symptoms, and solutions for maternal anemia in the communities. These activities served to make women feel comfortable sharing information in a less formal conversation, and then provided them with a constructive way to discuss anemia so that they left the focus group with a concrete plan for how they could prevent anemia.

3.5 Data Collection Procedures

3.5.1 Key Participant Interviews

A total of 28 semi-structured interviews were conducted (see Table 5). Of these, ten were with health care providers and other key informants including obstetricians in each study site, key informants at DIRESA, and a district insurance office. One informal interview also took place with a

key informant at SISMED. The same interview guide was used with all providers. Interviews with providers lasted on average a half hour, ranging from 22 minutes to 47 minutes.

Fifteen mothers were interviewed during the data collection period. Five interviews took place with participants in the rural location, four interviews were with women in the peri-urban location and six women were interviewed in two different parts of the urban community (see Table 4). One interview was conducted with two women at the same time in the peri-urban location when an insufficient number of participants showed up for a focus group discussion. Interviews with patients lasted approximately 20 minutes; some were as short as seven minutes and some as long as 47 minutes. The shorter interviews were abruptly ended when women had to leave in the middle of an interview to have their appointment, and dropped from analysis.

In urban and peri-urban settings, participants were interviewed in the hospital or health post while they were waiting for their ANC visit. Three interviews took place in a suburb-type neighborhood of Huanta where Window works. Women from this site were located and interviewed in the comfort of their own homes. All of these interviews took place in Spanish.

Women from Tambillo were interviewed in a variety of settings. Three women were located and interviewed in their homes by the obstetrician or community president. The rest were recruited in the larger health establishment located in the border area between rural Tambillo and urban Ayacucho. Only two of these interviews were conducted in Spanish; the rest were translated concurrently into Quechua with the help of CARE staff.

Interviews with partners from each of the communities were conducted at a community center while they were waiting with their wives for ANC or postnatal care visits. In Huanta and Luricocha these interviews took place in Spanish, while in Tambillo the interview was conducted in Spanish with several questions repeated in Quechua to ensure that the participant fully understood all of the questions.

3.5.2 Focus Group Discussions and Participatory Learning Activities

One focus group was conducted in each of the three locations (see Table 5). The FGD in Huanta took place at the end of an empty corridor at the hospital and lasted just over one hour. At the start of the discussion, 12 women had been recruited and briefed, but due to the location six other women joined during the course of the discussion and participated until its end. The FGD in Luricocha only had four participants and took place in a private meeting room at the health clinic, lasting 45 minutes. Both of the FGDs in Huanta and Luricocha were conducted in Spanish by the PI. In Tambillo, the focus group took place at the community center, where five women were recruited to participate, though one had to leave early before the end of the 50 minute discussion. Two members of the CARE staff served as translators and note takers during this FGD. For all three focus groups, women were accompanied by their babies and older children.

PLAs took place in the middle of the focus group discussion. Information generated from these activities was used to create diagrams representing women's understanding of anemia. When the anemia tree PLA was finished, a wrap up discussion took place and participants had the opportunity to ask any questions about the material covered. After the FGDs, participants were provided with light refreshments.

3.6 Description of guides

Interview and focus group discussion guides for pregnant and early postnatal women included questions that focused on a woman's knowledge about the causes and symptoms of anemia, where she received that information, and the key people influencing her decision-making about health issues (see Appendix). Specifically, questions focused on when a woman first received the IFA "blister," how she was counseled by health professionals about the supplements, her opinion of the supplement's presentation, her body's reaction to the supplement, what she understood about the importance of the supplement, and what factors (including people) affect her adherence to the prescribed regimen. Women were also asked their opinion of the iron supplementation program, how the fact that the pills are provided for free affect their adherence, and what suggestions they had

for improvements to the program and ways that other pregnant women like themselves could avoid anemia. Similar questions were asked of women's partners to determine their familiarity with the importance and purpose of IFA and awareness of women's experience taking the supplements (see Appendix).

Questions for obstetricians focused on their perceptions of the principal factors causing anemia among their patients, and their impressions of the national supplementation program. An important part of the interview guide included asking the obstetricians in what ways they counsel their patients when administering the iron supplements (see Appendix). Questions for members of DIRESA specifically and SISMED focused on the operation of the supplementation program and the future plans for improvements including collaboration with local NGOs.

3.7 Ethics

IRB approval was sought during the design phase to verify the ethical conduct of this study. Research protocols were reviewed and approved by Emory and local review boards. The consent process for all participants involved reading a brief explanation of the purpose of the study and participant rights before the interview or focus group started, then recording oral confirmation that participants agreed to the terms. Written consent was not possible for most of the patient population given the low literacy levels of the region. Informed oral consent was obtained from participants before they were interviewed or participated in a focus group.

3.8 Data Processing

All interviews and FGDs were recorded using a digital recorder. The qualitative data collected was transcribed in Spanish by the PI no more than two weeks after the interview or focus group took place. This allowed the PI to review the responses and make any additions or changes while in the field. Documents were archived by type, and any identifying information was removed to protect the confidentiality of the participants.

Data analysis was inspired by the principles and practices of grounded theory. Grounded Theory allows researchers to make sense of qualitative data during various stages of analysis to develop theory from research grounded in data rather than deducting hypothesis from existing theories (Charmaz 2006). Analytic codes and categories were created while reviewing transcripts and using the qualitative software MaxQDA, Version 10 (Verbi GMBH, Marburg, Germany). A list of codes and their descriptions that were used as a code book during analysis can be found in the Appendix. The PI wrote memos to develop categories, identify gaps, and make note of interesting concepts that emerged during the coding process. Codes and categories were constantly compared across different participant groups, broken down into location (rural, peri-urban, and urban) and by patient/providers. Thick descriptions were elaborated on salient concepts to explain the relationships between and context of findings. The PI summarized results into a conceptual framework and made available to CARE, other NGOs and MINSA in Ayacucho to inform their efforts to address maternal anemia.

3.9 Limitations

The scope and methodology of this study involve several limitations which affect its validity and generalizability. The study sites were chosen based on their overlap with CARE Window of Opportunity programmatic activities to combat the high rates of child malnutrition. These locations are not necessarily where the highest rates of maternal anemia can be found in Ayacucho or in Peru. On the contrary, due to the involvement of CARE and other NGOs, the sample population has received more educational instruction and attention than those living in other communities. Thus findings are not generalizable to populations in other communities outside of Ayacucho's *altiplano*. Also, the inclusion criteria necessitated that all of the participants had access to health care facilities and were seeking ANC, so did not include women who cannot or choose not to seek care to understand the measures they undertake to avoid anemia and what nutritional practices they observe during pregnancy.

In the rural communities throughout Tambillo, it was extremely challenging to find participants who fit the selection criteria due to low population density, the movement of people between different towns or into the city, and the occupational responsibilities of the inhabitants. It was also difficult to limit the focus groups to just pregnant women or women with babies less than two months old, and so in both Tambillo and Luricocha women who qualified included young girls under 18 and the mothers of eligible women. These older women had lots of experiences to share, and in general were very knowledgeable about anemia and the purpose of the supplements. This changed the dynamic of the group so that the older women started instructing the younger women on how they should care for themselves during pregnancy. Alternatively, the focus group discussion in Huanta was attended by too many women—almost 20 women arrived throughout the course of the discussion. Although the PI attempted to limit the number of participants, she was advised by CARE staff and the hospital nutritionist that she could not turn away anyone who had not already participated in the study thus affecting the rigor of the data collected.

Furthermore, although it was convenient to recruit participants at the health facilities, one downfall of this strategy was that it limited access to quiet spaces in which to conduct the research. It was difficult to create a sense of privacy when talking to participants in the institutions, and whenever possible the participants were taken into a private courtyard or quiet area outside where the conversation could be conducted. Women might not have talked as openly while sitting in a waiting room full of other patients as they would have in a private room, thus affecting the quality of the data.

Additionally, it was difficult for the PI to encourage in-depth answers from the participants, either due to her being an outsider or because of the way that she was phrasing the questions, resulting in thin data for many interviews. The length of most interviews was short; few exceeded half an hour. This can be attributed to the fact that the participants were interviewed while waiting for their ANC visit and sometimes had to leave for their appointment before the PI finished asking all of the questions on the guide. Participants were often distracted by the activity of the health

establishment while waiting to be called by the obstetrician and were reluctant to commit to a long conversation because they did not want to miss their place in the line.

Another limitation is that although the PI is fluent in Spanish, many of the participants spoke Quechua. This linguistic barrier represents not only a different way for the participants to communicate and understand the content of the questions asked, but also reflects the different cultural mindset of participants which was not be included in the scope of this investigation. Extensive research in Quechua was not possible given the budget and availability of personnel to accompany the PI during all of the fieldwork. Additional interviews and FGDs could have been conducted in Quechua to more accurately represent the demographics of the population, especially in the rural setting of Tambillo.

Chapter 4: RESULTS

The results of this thesis provide an overview of the supplementation program, as well as different points during the distribution chain where the perceptions of providers and patients coincide and where they are incongruous. Patients were fifteen women at least 16 weeks pregnant to six months postpartum. Providers included three obstetricians and seven directors of maternal health programs at hospitals and at the district level. First, this chapter will explore patient and provider perspectives on anemia, including their perceptions of the causes of anemia, the prevalence in the local population, and experiences with prevention measures. Next, results will focus on the barriers and facilitators of adherence to the IFA supplements that MINSA distributes. Lastly the role of the provider—specifically the counseling they provide—and (in)ability to monitor IFA consumption will be discussed. Recommendations made by both patients and providers for improving IFA supplementation will be presented.

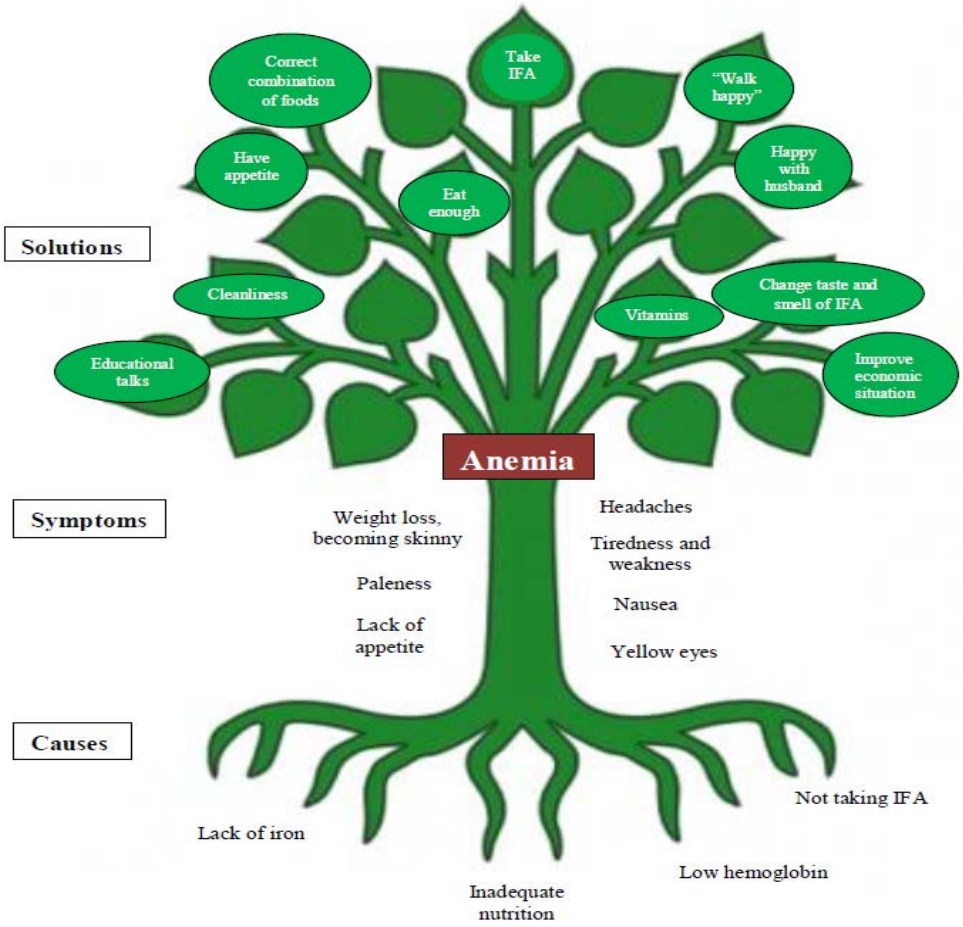
4.1 Anemia

4.1.1 Causes and general perceptions

When asked what the primary cause of anemia is among the patient population, all of the providers replied lack of proper nutrition. Providers claimed that one of the main reasons for this was because many of their patients value foods that are not nutritious. For example, they sell the eggs, milk, or meat that is produced by their livestock in order to buy rice or sugar. As one woman at DIRESA stated, "They are taking a small nugget of gold and giving it away and in exchange receive dirt. They do not know the value of their health; they do not understand." While this exchange negatively impacts people's diets, it also gives them the cash they need to pay for other household expenditures such as housing, school fees, medicine, and food that is less nutritious but can stretch further to feed a family. Providers perceive this to be the result of a patient not prioritizing their health, without recognizing the structural constraints on families to financially meet their needs.

Data were collected on women's perceptions of anemia through the problem tree activity conducted during focus group discussions, the results of which are summarized in Figure 6. Similarly to the providers, participants thought that anemia is caused by not eating enough food or by inadequate nutrition, and specifically through the "wrong combination of foods," which was not clearly defined by participants. Only three women knew that anemia is associated with low hemoglobin, but the rest of the participants identified anemia by its side effects. Women said that anemia causes dizziness, fatigue, headaches and fainting, weakness, weight loss, and small babies. This was supported by data from the providers, two of whom commented that their patients report dizziness or nausea attributed to anemia. These obstetricians said that these symptoms were more common among older women familiar with pregnancy, while the younger patients did not recognize nausea or dizziness as a sign of anemia. Two participants recounted how the obstetrician had told them that if they were anemic and did not eat the right foods then their baby would come out like "a little rat." Women also said that anemia turns the whites of their eyes yellow. All women knew that their loss of appetite during pregnancy could be attributed to anemia, and that taking their IFA tablets would improve their desire to eat.

Figure 6. Summary of results from anemia problem tree activity



4.1.2 Prevalence

The patients' perception of the prevalence of anemia in their communities was primarily based on peer experience and social norms. Only three women said that they had actually heard of someone who was anemic. One partner recounted that his sister had been diagnosed with anemia, and in a focus group one woman stated that she was anemic and receiving treatment. The remaining participants said that the women they knew were relatively unaffected by anemia. Patients often associated anemia with children as a result of the frequent educational talks conducted by CARE or by hospital nutritionists.

Similarly, providers noted that in their patient population the burden of anemia is greatest among children and that they saw very few women with severe anemia, which is assessed through

blood tests. Women receive two blood tests that are covered by SIS: when they enter ANC and in the ninth month. According to 2010 DHS figures, among women in Ayacucho who had a live birth and received ANC during the previous pregnancy, 84.3% had a blood test taken, compared to 89.1% at the national level. Providers knew that it is expensive for women to get an additional test to check Hb levels if later on in the pregnancy they suspect that the patient is anemic. Because of this, most obstetricians did not have women tested more than these two prescribed times, and lamented that their health establishment does not have the lab capacity to test women more frequently to know if they are consuming the IFA supplements.

Another factor contributing to providers' difficulty in measuring the true rate of anemia among pregnant women is that the software used by DIRESA's epidemiological departments has a different threshold for anemia than does MINSA. The obstetrician at the Huanta hospital described how the software classifies anemia at a Hb level of ≤11g/dL, whereas the obstetricians consider a patient anemic if her level is <12.3g/dL which is adjusted for the region's altitude. The differing cut-off values likely leads to under diagnosis and insufficient treatment of women in Ayacucho who develop anemia during pregnancy.

4.1.3 Prevention

Participants cited that proper food intake was the best way to prevent anemia. This included eating meat, especially fish and chicken since red meat is expensive, legumes such as lentils, dairy, eggs, and vegetables. Again both patients and providers emphasized that the combination of foods in terms of diversity of each meal is what is important. When asked about what makes it difficult for them to consume these foods, women commonly replied that cost was a main barrier, or that it is difficult for them to find certain foods where they live due to the altitude or distance from distribution points. The majority of participants also stated that even if they could access these foods, they also had no appetite or *ganas* (desire) to eat. Only when prompted did women mention that taking IFA was a good way to prevent anemia. Thus nutrition is an inextricably entwined part of

anemia prevention education, however, even though women are receiving IFA tablets they do not necessarily understand that the supplements prevent anemia.

Patients and providers had differing perspectives on women's value of health. Women said that they wanted to take care of themselves during pregnancy. But even if they knew what they should be eating to stay healthy, women's economic situation limited their ability to take care of themselves. Very differently, providers thought that culture—especially that of indigenous women—resulted in women not prioritizing their health. Figure 7 provides quotes representing the perspectives of patients and providers about the priority of health. This breach between in perceptions represents a breakdown in communication, and could contribute to the different reasons for why providers think that women do not eat nutritious foods compared to those that women presented.

Figure 7. How patients and providers perceive women's prioritization of health

Patients

- "Once you know you are pregnant you start doing different things to take care of yourself like eat more or eat something special or whatever to improve the pregnancy. But we have to plan our pregnancies otherwise this doesn't happen…once you become pregnant everything is different." –*Mother*

- "We eat what we have in the house. We don't have the budget to eat what we want when we want…When we have money we buy meat every day. But when there isn't money, "who will bring it [meat] to you?" –*Mother*

Providers

- "For the most part, a pregnant woman, well, arrives with anemia because she neglects her diet…There is an idiosyncrasy of the communities where we work, where health is not a priority…They have other priorities, but not their health and not nutrition…They are more focused on their farms, their land or their animals. But they are minimally focused on their health…it's part of their culture. Of their idiosyncrasies, their way of life, the way they feel, their way of thinking, in the communities." –*Rural obstetrician*

- "It is really difficult to get them [patients] to understand. They think that anemia does not have a repercussion on their health even though it does. Including the children, in the rural areas, they are kids but they fall asleep [a lot] and it's because of the anemia. It's simply because they don't believe…they are special people so it is difficult to work with them, you have to see how to put things so they understand you." –*DIRESA representative*

JUNTOS is the national conditional cash transfer program that aims to improve the health of underserved populations by providing an incentive for health-seeking behavior. Women enrolled

in *JUNTOS* are required to attend a minimum number of ANC visits and thus have guaranteed contact with a provider—which could be thought to improve adherence to IFA. However, this was not the case. Women who participated in *JUNTOS* said that the program did not affect their health in any way.

Several weeks prior to data collection, the health district of Ayacucho had experienced a maternal mortality due to preventable hemorrhaging, making the yearly total by June higher than that during all 2010. For this reason, obstetricians and maternal health directors were very sensitive to the effects that anemia has on complicating delivery and causing premature births. Despite this context, the obstetrician in Huanta was the only provider that discussed the importance of preventing anemia in her patients. She said that

> At the moment of the birth, as an obstetrician it does not benefit me if the patient is anemic…The placenta does not come out completely. This causes me additional time, another concern. So the idea is that the mother should have an acceptable hemoglobin level so that it guarantees us the postpartum period.

4.2 Barriers to IFA adherence

4.2.1 Timing of entry into ANC

MINSA's maternal health package mandates that women receive IFA starting at 16 weeks gestation with redistribution at each ANC visit. However, it is common for women to enter ANC late and not begin the regimen until well into their second trimester. Providers acknowledged that teenage girls delay entry into ANC because they are afraid to admit that they are pregnant. It was also very common for older women over 30 to be surprised by their pregnancy; the majority of participants in this age group had a 5-10 year gap between their previous child and the current pregnancy. This delayed not only older women's entry into ANC, but also the start of IFA supplementation.

Conversely, the obstetrician from the urban center of Huanta recounted how sometimes she sees patients who enter ANC before 16 weeks gestation. This obstetrician acknowledged how early

ANC initiation was one area in which MINSA could improve pregnancy outcomes to fulfill not only their objectives, but also to make progress toward MDG Five.

> They are used to coming in the first trimester, at six weeks, seven weeks. Thus if MINSA had folic acid, it would give us time to cover her and possibly prevent these malformations. You can improve the pregnancy.

Another aspect of ANC that limits women's access to IFA supplements is that obstetricians are the only people who can prescribe IFA and counsel women. Depending on how many obstetricians are attending on a given day and the number of obstetricians working at the health establishment, each provider only works between 8am and 2pm, limiting the number of patients that they can see per day to 12-15. A quarter of older women stated that they could not initiate ANC because their workload, both inside and outside the household, is very time consuming and makes it difficult to go to a health post or hospital when an obstetrician is attending. One participant described how she tried to go to the hospital several times after leaving her job in the early afternoon, but was turned away because the obstetrician had already left. This makes it difficult for women to receive their IFA and adhere to the supplementation regimen.

4.2.2 Physical presentation of IFA

Women expressed dislike or mistrust of the appearance of the packaging or "blister" in which the tablets come, as well as the tablet itself. While women tended to think of the supplement as a vitamin, the blister reminded them of a medication that they might take to treat an illness. Some women stated that the supplements have a similar appearance to the antibiotics that doctors prescribe for other health conditions due to the "MINSA" label printed on the packaging, and that because of this they do not trust the quality of the tablets. Others thought that the tablets had expired because the packaging was difficult to interpret. As one woman noted:

> They look like they have gone bad or something like that. The odor is very strong and smells like metal. And you can't see the [expiration] date because it says "MINSA MINSA MINSA" all over the package. I think that it has gone bad because the smell is gross and the pills seem old.

For this reason women stopped taking effective tablets, wasting the IFA they received during the remainder of their pregnancy. In general, women thought that these negative attributes of the tablets were a result of the government giving them a "cheap" product.

4.2.3 Side effects

The physical presentation of the IFA tablets deterred women's adherence to the prescribed regimen. Providers noted that side effects were the most common reason why women discontinued use, which is consistent with existing data on IFA supplementation. Over three quarters of the participants said that the tablet *me asquea* or grossed them out, others said that it smelled "oxidized" and *fea* (ugly) or like blood. Due to this smell and taste, women commonly said that the tablets made them nauseous, gave them a stomachache, sometimes made them vomit, or caused constipation. Others responded that the supplement increased their appetite. In turn, women felt this caused them to gain too much weight, sometimes to the point where they were worried that they were too fat.

While some participants continued taking the tablets even if they didn't like how the supplement made them feel, most admitted that they stopped after taking only two of the tablets. Every provider realized that the most common reason for a woman to stop supplementation was because of the side effects. "Unfortunately this has an unpleasant iron taste so that's why during the first months it gives women nausea and vomiting. They can't stand anything else and therefore do not consume it." Providers explained that MINSA does not attempt supplementation prior to 16 weeks because women experience morning sickness or nausea during this period and cannot support the gastric discomfort caused by the IFA tablets.

Some pregnant women said that they didn't feel anything. Usually this meant that they completed the regimen as prescribed. However, one participant said, "I didn't feel anything, so I stopped taking them, I didn't like it." This reflects the expectation that women incorrectly believe the supplements are supposed to have some noticeable effect, such as an antibiotic curing a urinary tract infection.

An interesting difference emerged between the reported adherence of multiparous and nulliparous women. Older women who had had a negative experience with IFA supplementation during previous pregnancies said that although they were prescribed tablets by their obstetrician for the current pregnancy, they did not bother taking them again for fear of a repeat experience. In comparison, first-time mothers were much more likely to work through their side effects, and in general were more optimistic about continuation. This difference in adherence by age and parity was not addressed by the providers.

4.2.4 Alternative forms of IFA Supplementation

Patients stated that the appeal of taking an alternative supplement is that it tastes better, and because the pills or syrup did not cause nausea like the generic tablets provided by MINSA. Women with the economic means or physical access to a pharmacy can purchase *Madre* or *Natal*, alternative over-the-counter prenatal vitamins that contain iron, folic acid, and other micronutrients. The director of the insurance network's maternal health program noted that among their urban populations, they see that pregnant women "receive the IFA, but their economic income allows them to buy another kind of supplement like *Madre*."

However, providers are required to prescribe their patients with the regimen of MINSA-issued IFA tablets, even if they know the patient is not complying with the regimen. This means that women who are covered by SIS and have the economic means to purchase alternative supplements will get both. The obstetrician from Huanta explained this mandate as follows:

> In the case of…a patient that is covered under SIS, MINSA pays us for the services we provide for her. For this reason, when I am attending a pregnant woman, if I do not give her the ferrous sulfate then the SIS does not reimburse me for her care because I am not following the norm that requires me to prescribe the ferrous sulfate. So we have to give the pregnant women this supplement in accordance with the established norms. There is not an optional way where I can tell the patient that she has the alternative to use another kind of supplement without also giving her the one provided from MINSA.

Other women said that they did not trust the supplements because they were provided for free and thus chose to instead purchase the alternative *Madre* or *Natal.* A 26-year old woman who was interviewed during her fourth pregnancy said:

> Some of the medications that they give us don't have an effect. When you buy them they do have an effect because it's not the same as what they give us basically every time we are sick…Sometimes one doubts if the same medicine will make a difference… For that reason I think that since it is free, it's not very good.

Providers were aware of the opinions of patients ranging from distrust of the supplements to appreciation that they were provided for free, and tried to take this into account by providing women with an alternative option. In this way the generic tablets that MINSA provides for free sometimes go to waste among women who can afford alternative supplements.

4.3 Facilitators

4.3.1 Price

While three women said that the free provision of IFA made them not take the supplement out of distrust, the majority expressed how they really appreciated that they were provided for free and facilitated their adherence to the regimen. Some participants said that being free is a necessary "assistance" for some families who could not otherwise afford the supplement. As one partner stated "It is helpful for us young parents who, now that we have a kid, don't have enough money." Given the poverty levels in Ayacucho, the general consensus among women was that the government should provide IFA for free, because otherwise they would not buy the pills and thus be unable to prevent anemia.

4.3.2 Supply

One of the most basic indicators of an IFA supplementation program's success is whether or not health establishments have a stock of IFA to prescribe to pregnant women. The rural obstetrician said "It is important to keep in mind that as long as you have a supply, all kinds of problems are solved." Patient and provider opinions of IFA supply offer insight into the operation of the supplementation program in Peru and specifically throughout Ayacucho.

Records from the SISMED district office of Ayacucho were consulted to determine the number of IFA tablets ordered and distributed to the different health establishments throughout the district in 2010. Health establishments calculate their projected IFA need based on the number of

pregnancies from the previous months. According to these records, only 71.2% of all women in Ayacucho would have been covered by the quantity of tablets distributed to health establishments (see Tables 6 and 7), while the 2010 DHS claims that 88.9% of women received IFA. However, this proportion is misleading for two reasons: 1) they do not reflect the actual number of women who received pills, since records were not obtained during data collection; and 2) the denominator includes women who were not enrolled in SIS and who would not have been eligible to receive the IFA for free. These discrepancies could have thus misrepresented the actual demand.

Table 6. SISMED records of tablet and syrup stock compared to number of pregnant women, Ayacucho 2010.

	Ayacucho (8 Redes)	*Red Huamanga*	*Red Huanta*	*Huanta (Huanta)*	*Luricocha (Huanta)*	*Tambillo (Huamanga)*
Total # pregnant Women (MINSA)	16,475	6,086	2,643	1,056	133	142
Total # IFA tablets distributed	1,760,454	636,727	190,985	63,896	20,343	9,990
Quantity syrup distributed	21,862	6,959	2,397	29	186	73
# Women covered over 5 months	11,736	4,245	1,273	426	136	67
% of women covered by IFA	71.2	69.7	48.1	40.3	100.0	47.3

Table 7. Proportion of pregnant women who received IFA supplement during last pregnancy (ENDES 2010)

	2000	*June 2007*	*2009*	*2010*
All Peru	60.2	74.9	80.1	86.1
Ayacucho	60.8	73.7	88.2	88.9

While neither the obstetricians nor patients noted that they had experienced a recent lack of IFA supply in their health establishment, participants from DIRESA and SIS discussed their awareness of several cases where a health post did not have adequate supply. As a maternal health director stated,

> More or less the health posts run out of iron sulfate because they didn't make the purchase when they had the chance. So they have to go to DIRESA, either the network or the micro network, and there is a delay...They submit a requisition with their supplies and the average monthly consumption.

DIRESA views it as the responsibility of the obstetricians and pharmacists to keep track of their supply needs, and make the necessary arrangements with the network to procure the forecasted amount of IFA. Similarly, the idea that the calculated quantity of IFA demand is based on average monthly consumption of IFA can cause some under- or over-estimation of supply needs if for some reason more or less women enter ANC that month. As a solution, the same DIRESA representative suggested improving the census of pregnant women that the health establishments maintain and have a better projection of the number of new pregnancies that will be attended in their health post or hospital.

4.3.3 Partner Support

One of the most effective facilitators of women's adherence to IFA was the support of a partner. Participants would recount how their partners playfully force them to put the IFA tablet in their mouth and swallow, or count their pills to make sure they are not forgetting a day. One woman recounted how her husband forces her to take her IFA tablet:

> When he is home, he obligates me to take it. He grabs my hand and watches my while I take it and looks in my mouth after; I can't avoid him. But when he isn't there I don't comply he is the only one who obligates me.

Another woman said, "When I don't want to take it, he brings the pill and sometimes makes me. If you don't take it, I will hit you he says." Other partners threaten to tell the obstetrician if she does not take her supplement. However, men commonly work outside of the home or travel to another city for their job and are not around to remind women to take their supplement every day.

In order for men to understand the importance of their partner taking IFA during pregnancy, they need to receive accurate and convincing information about the benefits of the supplement. Although participants said that they spoke with partners about their pregnancies, half of the women were indifferent about whether or not their partners accompanied them to their ANC visits. This was due to the husband working or having to stay behind to manage household duties such as childcare and tending the livestock while a woman is away. Nonetheless, one woman said that she thought the obstetrician should make the couple come together to every visit because it is

just as important for the expectant father to come as it is for the pregnant women. "There they will tell him that his wife is malnourished, and to feed her! Or to treat her well if they are fighting. That's why I tell my husband, '*Papi*, come, let's go to my appointment.'"

Women also discussed how they view a man's role in their partnership as providing economic support. One mother, when comparing the health of her two daughters who were pregnant at the same time, stated that the one who received the economic support of the baby's father gave birth to a fat, healthy child, while the other daughter who did not have a partner became anemic and delivered a baby who was small and sickly. For this reason women thought that being with their partner during pregnancy meant that he could materialistically and financially give her what she needed to be healthy.

4.4 The importance of counseling for adherence to supplementation

All three participating obstetricians described counseling as an opportunity to provide integrated information to their patients. They noted that the content of counseling provided during pregnancy 'controls' should include a discussion about nutrition, such as the importance of eating a balanced diet and proper intake of protein-rich foods. Providers used the word "*sensibilizar*" almost synonymously with counseling (*consejería*), although when translated into English refers to the word more specifically means raising awareness. They referred to the act as sitting down and "sensitizing" patients as a way to truly make her aware of the importance of IFA and other ways to care for herself during pregnancy. Providers especially see the connection between sensitizing women and consumption of IFA: "When an obstetrician is able to talk to the woman and sensitize her, she accepts [the IFA]. She takes it." Counseling generally refers to an exchange of ideas between a provider and patient, so that the information is assimilated into the woman's way of acting. The concept of raising awareness does not have the same connotation of patients translating information learned, even though the participants used the term "*sensibilizar*" in this way.

A main factor contributing to a patient's uptake of IFA is the relationship of trust that she feels with her provider. When comparing differences in the obstetricians' perceived role across the

three locations where data were collected, a breadth of information about counseling emerges. For example, the obstetrician from Tambillo emphasized how important the first ANC visit is in order to gain the trust of patients and in setting the tone for the rest of her pregnancy so that the counseling he provides takes maximum effect. "Counseling is very important during the first visit. Because if we fail during the first visit this relationship between client and health workers, forget it, it's all over. You will no longer have this confidence." He discussed how he did not think that his patients have a problem with adherence as a result of this confidence that they feel with him; if they experience side effects or have trouble taking IFA tablets for some reason he helps them find a successful solution. None of the other providers from the health establishments or maternal health programs discussed the role that counseling plays in adherence, or the responsibility that the provider has to positively influence a patient's decision-making behaviors. On the other hand, the rural obstetrician from Tambillo placed a lot of responsibility on the obstetrician's role in influencing a woman's pregnancy outcomes, and optimistically recounted how a provider can overcome cultural barriers to adherence such as *machismo* (a husband dictating his wife's health-seeking behaviors) through successful counseling.

Very differently, the obstetrician from Luricocha was pessimistic about her impact on patients and the overall purpose of counseling. Instead of talking about what she could do during prenatal visits to ensure that women understand the importance of the supplements, she kept returning to the need for monitoring activities because she doesn't know if her patients are actually taking their supplements. The obstetrician from Huanta only used the word *consejería* once during the interview, (compared to the other obstetricians who used it multiple times), but gave very concrete examples of how she discusses the purpose of the supplements and the health impacts of anemia with her patients, offering insight into the context in which counseling takes place. She says that she looks at the color of the conjunctiva and palms of women to assess their hemoglobin levels then tries to scare them into taking their supplements by giving horrifying examples of what could go wrong at the time of delivery if they don't have enough iron stores. The outcome of these tactics was not

mentioned. Constructing several of these if-then scenarios is a very effective (and conscious) way that the urban obstetrician approaches "sensitizing" her patients about the cause and effect of rationale for taking the iron supplements.

Much of the literature on daily IFA supplementation focuses on attributing women's difficulty with adherence to an inability to remember taking the supplement each day. However, participants said that they rarely forgot to take their IFA tablets. All of the participants, including those not taking the supplement were very clear on how they should take IFA. Every woman, as if on cue, said that she took the supplement at 10 am with a glass of lemonade. Women did not understand that the providers have them do this to improve absorption, but instead thought that it was to help alleviate side effects. This is due to very clear messaging that women receive during the counseling that takes place during ANC visits. Due to the consistency of these results, they could be influenced by social desirability bias.

4.5 Patient and provider recommendations for improving the IFA supplementation program

All of the providers expressed frustration with the challenge they face in not being certain as to whether or not their patients adhere to the IFA regimen. Because such a large proportion of women stop taking the supplements due to side effects, providers wanted a better way to monitor consumption outside of ANC visits. As noted above, blood tests to measure a patient's hemoglobin levels are expensive and conducted infrequently, making it challenging for them to accurately assess a woman's risk for anemia. When asked what difficulties providers face with IFA supplementation among patients, the obstetrician from Huanta responded:

> The difficulties that we have is the monitoring, the follow-up [with patients]. We do not know who is consuming or not consuming. We give out the supplements… [but] we do not know if they take them or throw them out or give the packets to someone else. We do not know. This is a great difficulty. I think the government should be well aware of this situation.

Additional monitoring would allow providers to know when a woman makes this decision to provide her with the necessary support so that she continues. The same obstetrician summed up the providers' recommendation for improvement of the supplementation program by saying:

> To provide quality care for the patient, so that she does not get tired of waiting, so that the little bit that we do in antenatal care is sustainable, we need to do continuous monitoring. We need to make home visits.

Home visits as a way to improve monitoring was very popular, and discussed by obstetricians and DIRESA staff alike. Obstetricians stated that they wished they had the time and resources to visit women in their homes, so that they could ask to see the IFA blisters and count if the women were taking the tablets in adequate quantities. The obstetrician in Tambillo said that he asks patients: "Show me your vitamins. How many do you have? Do you have extra or are you missing some?' They will say, 'I forgot.' Or 'No, I took double.' In this way I can follow them." Home visits allow providers to not only monitor consumption of IFA, but to give personalized counseling in a comfortable setting where the woman is more likely to understand how to best take care of herself during pregnancy.

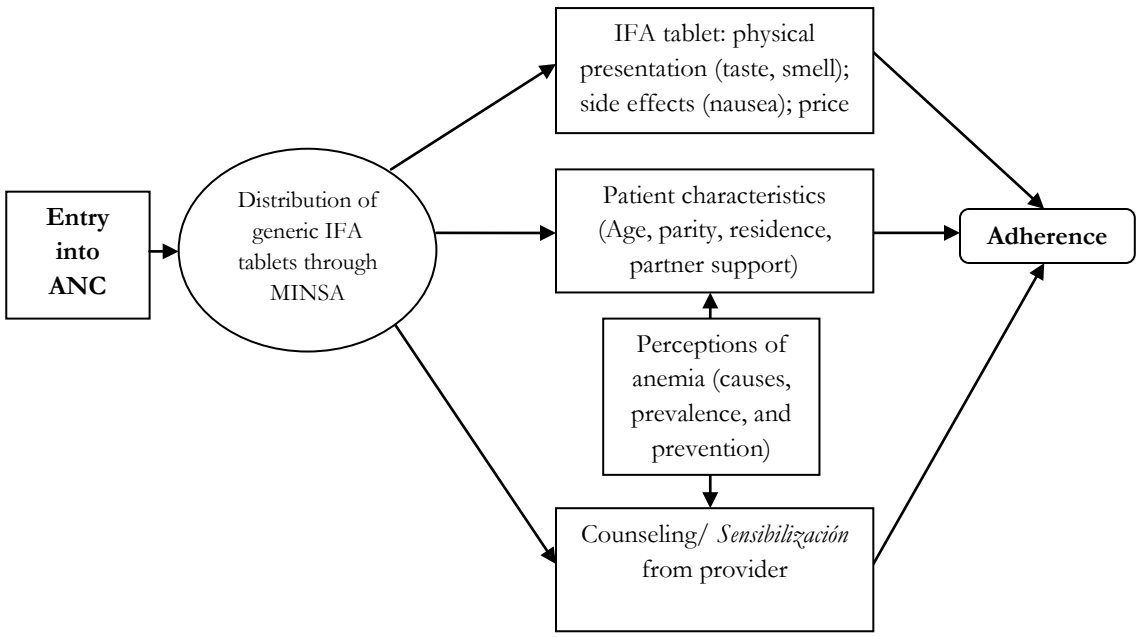
Providers noted that the bad smell and taste of the supplements, along with the high prevalence of side effects that cause a woman to stop taking IFA, is due to the generic form of the tablets. Since the generic IFA formula is the least expensive to manufacture, the tablet lacks a casing or slow-release function. Almost all said that if MINSA were to contract pharmaceutical companies to change the physical presentation of tablets, then fewer women would experience side effects and adherence would improve.

The other alternate strategy for IFA supplementation is through home fortification. Micronutrient sachets called *Chispitas* (Sprinkles) are distributed by MINSA for consumption by children under five to reduce micronutrient deficiencies. Mothers are familiar with *Chispitas* and say that the powder has a similar taste and smell of oxidation and iron as do the IFA tablets, though none of them had ever tried the pudding into which they mixed the packet for their children. These women noted that their children are most likely to consume *Chispitas* if it is mixed into something sweet, like yogurt. The director of maternal health at the Huamanga insurance network stated that they have noticed that more children consume *Chispitas* than the syrup they used to distribute, and that it is better absorbed than other kind of micronutrient supplements. She said that it would be

good if MINSA provided an alternative supplement like this for pregnant women and not just for children. However, the rural obstetrician recounted that even though his clinic was one of MINSA's test sites for *Chispitas* distribution, they often had issues with irregular supply which made it difficult to evaluate the impact of the program on children's nutritional status.

Another suggestion that providers made for improving the effectiveness of IFA supplementation is to initiate preventative supplementation among adolescents. At the time of the study, DIRESA was conducting a pilot study that provided folic acid to adolescents three months before pregnancy as part of their plan to develop a preconception program. However, the representative interviewed admitted that "unfortunately we don't know what moment will be three months before pregnancy" because such a high proportion of the pregnancies that occur are unplanned. The obstetrician from Luricocha admitted that they need to be talking to girls earlier so that they know about supplementation long before they ever become pregnant. "This is something we lack: going to schools, forming parenting schools, to promote the importance of iron supplements two months before she can become pregnant, before conception."

Figure 8. Factors influencing pregnant women's adherence to IFA supplements



As Figure 8 shows, the main factors that influence women's adherence to IFA are: 1) the physical attributes of the tablets including their appearance and smell, associated side effects, and price; 2) the individual characteristics of a woman such as her age, parity, residence in urban or rural community, and the level of partner support she receives; 3) a woman's perceptions of the causes, prevalence, and prevention of anemia; and 4) the counseling or *sensibilización* that the provider conducts during each ANC visit. The similarities and differences between compared perceptions of patients and providers and between rural, peri-urban, and urban locations explored here contribute valuable insight into the successes of Peru's IFA supplementation program in Ayacucho and also into areas that merit improvement. In the following chapter, implications of these results will be explored. Recommendations based off of this analysis will be provided for how MINSA, DIRESA, SISMED, and local NGOs such as CARE can use their existing capacity to improve the IFA supplementation program and decrease maternal anemia throughout Ayacucho.

Chapter 5: DISCUSSION

Reducing the incidence of anemia among pregnant women is important to ensure that women have the energy to better take care of their families and that their children are born with the iron stores they need to reach their full physical and cognitive potential. MINSA operates an IFA supplementation program that provides adequate supply of tablets to pregnant women, yet women's adherence remains low. In Ayacucho, women's adherence to IFA is affected by micro- and macro-level factors. Findings from this study show that women's individual characteristics such as age and parity or the effectiveness of an obstetrician's counseling strategy play just as important a role in IFA supplementation, as do larger structural issues like MINSA's distribution of IFA or the physical presentation of the tablets. One of the goals of this thesis is to use the findings that emerged from formative research to explore alternative strategies for increasing pregnant women's adherence to IFA. This discussion will provide a brief summary of suggested policies and measures MINSA, DIRESA, SISMED, and NGOs such as CARE Peru can put in place to address anemia, and will also identify directions for future research.

5.1 Study findings in perspective

Many of the findings for why women do not adhere to IFA supplementation regarding side effects are consistent with DHS data and the results of Munayco's 2010 epidemiological study conducted in Ayacucho. It is widely known that women worldwide do not like the smell or taste of iron supplements, and that they commonly experience side effects such as nausea which serve as a major barrier for women's adherence to IFA. In the case of Ayacucho, providers recognized that the generic format of the IFA tablets produced by MINSA is very harsh, and could be improved. Similarly to DHS data, this study found that older women who already have at least two other children are less likely to adhere to IFA supplements than younger women who are first time mothers or who have fewer children.

Research on barriers to supplementation in other countries, and specifically the eight-country MotherCare study conducted by Galloway et al. (2006), find that supply is the biggest

contributing factor limiting women's ability to adhere to IFA supplements. Consistent with DHS data indicating that 88.7% of women in Ayacucho receive IFA, this was not shown to be the case in Ayacucho. Women and providers instead stated that health establishments had sufficient stock of IFA during the period before data collection. If stock was insufficient, it was because the health establishment did not follow the necessary procurement procedures with SISMED in a timely manner. As a broader public health implication, this shows that in countries like Peru where supply is not an issue, the Ministry of Health can focus on strengthening the interpersonal aspects of their delivery system.

An important aspect of supplementation is the counseling given by providers during women's ANC visits. As Adhikari, Liabsuetrakul and Pradhan (2009) have shown, education and pill counting conducted by providers increased Nepali women's hemoblobin levels and decreased anemia by 59%. Olude's meta-analysis (2011) showed that nutritional education and counseling provided to pregnant women significantly reduced anemia by 30%. In Ayacucho, results show a discrepancy between patient and provider opinions on health priorities. Providers think that women, especially indigenous and rural, do not prioritize their health, while patients acknowledge that they want to take care of themselves as best possible during pregnancy but do not always have the knowledge, economic resources, or time to do so. Encouraging providers to understand the health goals of their patients and what barriers they face might help facilitate better communication and adherence to the supplementation regimen. Women could then be empowered with a sense of control over their health, and thus become more likely to complete the IFA regimen. Based on variations in the responses from participating providers, obstetricians need to believe that they have the ability to affect change and influence the behaviors of pregnant women. If obstetricians think that a patient's culture or lack of willingness influencing her adherence is insurmountable, then they are missing a crucial opportunity to influence her potential to prevent anemia.

An important component of counseling that needs to be addressed is the difference between *sensibilización*, or raising awareness among patients, and what public health workers consider as

constituting "counseling" (*consejería*). *Sensibilización* does not involve active participation of the patient to understand and assimilate the messages transmitted by the provider, while counseling does. Providers need to be trained to offer counseling that consists of a two-way discussion that allows for patient input. This will allow providers to understand and address the lived realities of women, narrowing the disconnect between how providers believe patients value health. In this way patients and providers can work together to overcome the barriers that women face in achieving optimal nutrition and supplementation during pregnancy, improving their ability to maneuver the health care system and socioeconomic situation to maximize health outcomes. Also, as Munayco et al. (2009) showed, counseling efforts should be focused around the 24th week of pregnancy, when IFA adherence is lowest.

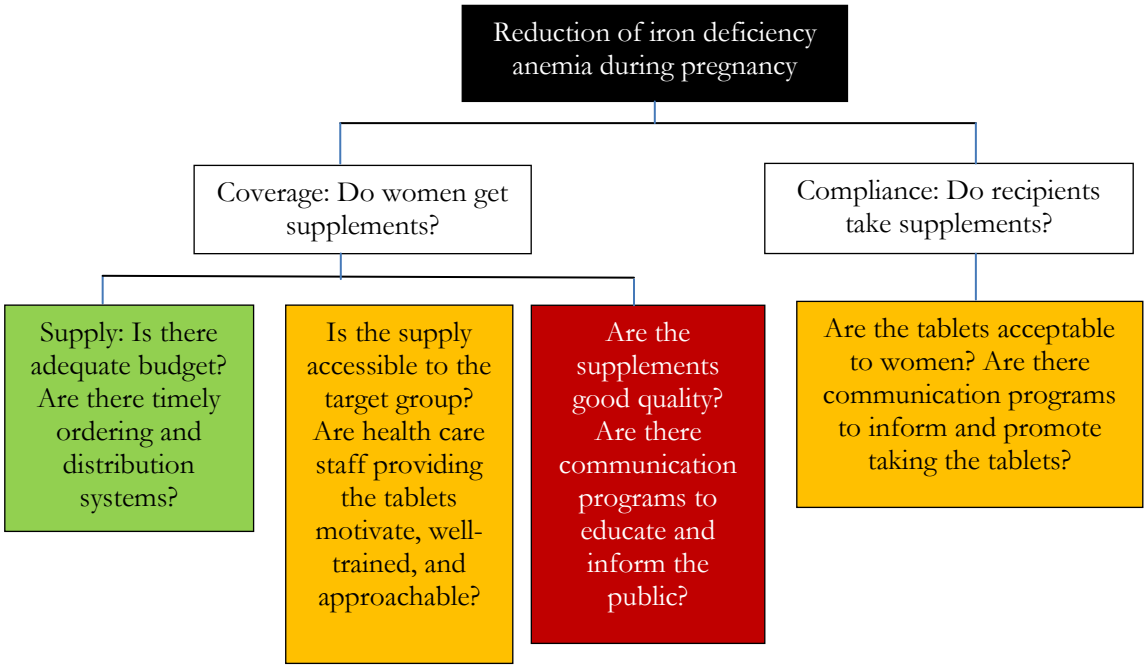
One important aspect influencing women's adherence to IFA supplements is the support of her partner. Very little literature both specific to Peru and in the global context of IFA supplementation focuses on the people who influence a pregnant women's IFA-related behavior. However, this study showed that a woman's partner, when present, is the person who greatly impacts her health decisions. A fifth of the participants alluded to their husband forcing them to take IFA, and further research on partner control over women's health behavior is necessary to better understand how this could be affecting their adherence to the regimen.

When evaluating an IFA supplementation program, it is necessary to take into consideration factors of coverage and compliance. Figure 9 illustrates the questions that are pertinent to ask during program assessment, and which will be answered for the context of Ayacucho through this chapter per the ranking of green, yellow, and red. Green indicates that the program is doing well, yellow denotes areas that are in place but need improvement, and red shows what aspects need particular attention.

Overall, Peru's IFA supplementation program is operating well. The strengths of the program such as the delivery platform, the fact that supplements are offered for free, and adequate supply serve as a great example for ministries of health in other countries that are either designing an

IFA supplementation program or looking to improve their current implementation. In this way Peru is a prime case study for public health research on the topic. Further implications of the Peruvian case are to focus on the behavioral aspects influencing supplementation, recommendations for which will be provided in the following section.

Figure 9. Elements to consider in iron-supplementation programs (adapted from IYCN, 2011)



5.2 Recommendations

Recommendations for improving Peru's IFA supplementation program can be applied at both the national and regional levels Ayacucho where there are overlapping contexts to those of the study sites (see Figure 10). From a national policy level, results from this study show that a social marketing campaign could be effective in using the existing delivery platform of daily IFA supplementation to improve women's adherence. Recommendations include tailoring specific messages to segmented groups of older and to younger women, indigenous women, and new mothers as well as those who are multiparous. Additionally, partners and men need to be involved in supporting women to take supplements.

Figure 10. Future directions for improving IFA supplementation in Ayacucho and Peru

National:

Implement social marketing campaign:

- **Product**: Improved packaging; non-generic formula; messaging to take supplements with food; offer optional dose and presentation of IFA supplement (syrup or *Chispitas*)
- **Price**: Continue offering supplements for free
- **Placement**: Maintain current delivery platform; advertise in pharmacies and small shops
- **Promotion**: TV and radio campaigns on the importance of IFA supplementation during pregnancy; text messaging; public advertisements on buildings and informal billboards; messaging targeted at men in bars and at community meetings
- **Policy**: Providing IFA for women who enter prenatal care before 16 weeks; preventative supplementation among adolescents

Programmatic (DIRESA, JUNTOS, CARE Peru):

1) Promote home visits by obstetricians to monitor consumption;
2) Continue to support nutrition interventions to prevent anemia;
3) Requiring partners of *JUNTOS* participants to accompany women during ANC visits

Research:

1) What needs to happen during home visits to improve adherence?
2) What kind of marketing for IFA is most appealing to women?
3) How to further involve partners?

5.3 Social Marketing Campaign to promote IFA adherence

Behavioral theory offers insights into the current behavior of target audience members and what might influence or change that behavior. As an approach, social marketing promotes behavior change through voluntary exchange and positive reinforcement. The Theory of Reasoned Action (Fishbein & Ajzen) and the Theory of Planned Behavior (Ajzen) examine the relationship between an individual's beliefs, attitudes, intentions and their intention to act or behavior (Lefebvre 2000). It is important for social marketers to consider individual attitudes, subjective norms of the community, and perceived behavior control when developing interventions. They must also pay attention to how their intervention affects perceived benefits of participating in a behavior, whether or not participation decreases perceived costs, and increases perceived social pressure or behavioral control in order to forecast effectiveness.

In public health, social marketing has primarily been used to promote reproductive health and nutrition, though nutrition programs with a social marketing focus in a developing country

setting have been far less common (Storey, Lee, Blake et al., (2011). For instance, IFA supplementation programs involving social marketing strategies have been successful, such as the Caribbean Food and Nutrition Institute's project in Jamaica that improved adherence by urging women to take tablets with food, and also by encouraging them to switch to another supplement such as liquid iron or by counseling and trying to explain the importance of taking iron tablets (Storey et al., 2011). Several studies have shown that social marketing and community mobilization programs improve iron status and decreases anemia among women of reproductive age through both daily and weekly IFA supplementation (Sanghavi et al., 2010; Favin & Griffiths 1991; Jacques, Thanh, Cavalli-Sforza, et al., 2005; Crape, Kenefick, Cavalli-Sforza, et al., 2005; Khan, Thanh, & Berger, 2005). However, effective, large-scale social marketing programs for IFA supplementation are not as common in Latin America.

This study provides a base of formative research that can be used to develop a social marketing campaign in Peru that could be extended to other Latin American and Caribbean programs that operate national IFA supplementation programs. All recommendations take into consideration cost and preexisting marketing structures so that the campaign fits within MINSA's budget. Before implementation, it is necessary to conduct additional research to determine the needs of consumers, including additional focus groups to test materials, creating or adapting consumer marketing databases to provide detailed profiles of target audience segmentation for message development and dispersion, and interpret surveys. This can be accomplished by addressing the "5 P's" of marketing mix: Product, Price, Placement, Promotion, and Policy (see Figure 10).

5.3.1 Product

IFA packaging should make the supplements look more like vitamins and less like medication, and appeal to women's desire to be good mothers and attractive wives. This could involve packaging that has appealing colors and images. The "MINSA" label should be less obvious and the expiration date clearly marked, instead branded with a name that evokes femininity and

motherhood. Pre-testing needs to take place to ensure that product name combined with packaging images and text that are appealing to women and evoke a sense of femininity and motherhood.

Since side effects such as nausea are a primary reason that Peruvian women stop taking their IFA supplements, women should be encouraged to take the supplements with food through the different messaging channels addressed below. Another alternative is to provide women with the option to take supplements in another format such as syrup or *Chispitas* (Sprinkles) so that women could mix the micronutrients into sweet foods such as quinoa porridge or into yogurt to increase uptake. *Chispitas* could be provided for a very affordable price. Additional messaging will be needed to advertise the product as "new and improved," to make it clear that it will no longer be offered for free. Finding a balance between the dose and frequency of the product's consumption is difficult, but imperative.

5.3.2 Price

Due to the low economic status of the rural and peri-urban populations in Ayacucho, the Peruvian government has set a precedent of providing education and health services for free. SIS is an example of this, and the government has recently made it a priority to improve the quality of the free national services that they offer as is the case in Peru (personal communication, Carlos Rojas). For this reason, the women are so accustomed to receiving IFA for free that they would likely not pay if charged for the tablets. Over three quarters of the patients and providers who participated in this study acknowledged that the free cost of the IFA supplements was an important facilitator to adherence and should continue to be offered in the same way. It is also important that MINSA remains consistent with the current policies, strengthening the system that is already in place rather than implementing anything new.

5.3.3 Place

MINSA has spent over a decade refining their delivery platform, which has resulted in adequate stock of supplements from the current distribution point of IFA supplements at health

facilities. Nevertheless, supplements could also be made available to women in private pharmacies and sold at a minimal cost. Depending on the specific sub-sector of the population of pregnant women, especially those who might be stigmatized by use of the public health system such as women with economic means, obtaining IFA from a more prestigious source would improve uptake. While these women already purchase their own supplements, by offering an additional distribution point and making the IFA more appealing women might be more inclined to take the IFA tablets provided by MINSA, creating less wastage and allowing women to allocate the unspent money to other household expense. This has been seen to be effective throughout Central America (Favin & Griffiths, 1991), and merits being tested in Peru. Another option is having *promotores* distribute IFA tablets to women in their homes, which would be particularly effective in rural areas where women have less access to health facilities or may not be able to communicate with health care staff due to language barriers.

5.3.4 Promotion

As the target audience, pregnant women should receive specific messaging that is so convincing it overrides whatever side effects or downsides of the IFA that they might perceive. Rather than focusing on the rational awards of taking IFA such as the benefits of iron (and folic acid) and its benefits to both mother and baby during pregnancy, promotion should focus on emotional incentives. The tablets should be advertised as vitamins, not medication, to dispel any misinformation that the tablets could do harm to a woman's baby as do some antibiotics. Most importantly, the product should appear "sexy" to women, advertising how a woman who takes IFA during pregnancy will be attractive and fashionable which has a convincing emotional appeal with which most women can identify. This social marketing approach has been very successful with other products such as contraception. Obstetricians and providers should be trained on how to offer adequate and appropriate counseling, reinforced by pamphlets and promotional materials that are easily understood by populations with lower levels of literacy and who speak Quechua.

Alternative forms of awareness-building should also be considered. A large portion of advertising in Peru is unofficially painted onto the sides of mountains or private buildings. Most households own a radio or television, so short announcements advocating the importance of IFA could be broadcast on popular channels. In order to do these activities effectively, all messaging should take place in both Spanish and Quechua, with specific research conducted on when and where to air radio or TV spots and designing information to be culturally-specific to the target audience.

In Peru, as in many other countries, *machismo* (male chauvinism) is very prevalent and is manifested in how men exert control over women's health-seeking behaviors. Men's dominance is also linked to their virility as embodied by producing children, so they are inclined to support their partner in taking the supplements if they know that the IFA will improve their babies' cognitive and physical development. Radio and TV messages can be aired at times when men primarily tune in. Additionally, tailored posters could be put up in bars and small shops frequented by men, and messages can be reinforced during community meetings led by local political leaders.

5.3.5 Policy

MINSA should adapt IFA guidelines so that women who enter prenatal care before 16 weeks gestation are prescribed a folic acid supplement, or, for those without nausea, provide them with IFA. Women covered by SIS and who experience adverse side effects when taking the generic IFA tablet should be offered alternative supplements such as the syrup or *Chispitas* for a reduced (and affordable) price. MINSA should also monitor that providers offer a package of standardized information during counseling sessions, reinforced with pamphlets and promotional materials that answer women's common questions about the IFA regimen.

The other measure that can be undertaken is development of anemia prevention strategies among adolescents. As a representative from DIRESA explained, regional health officials are piloting a trial program that provides supplements to young women three months before pregnancy. But because many pregnancies are not planned, this trial program is not a targeted form of prevention. A

better way to accomplish anemia prevention would be through extending weekly IFA supplementation to adolescents in secondary school, so that they have higher iron stores for when they eventually become pregnant.

5.4 Programmatic (DIRESA, JUNTOS, CARE)

While MINSA has been successful at putting in place macro-level programs and mandates to prevent anemia among pregnant women, they have no plan to address the underlying causes of anemia which is ultimately the only way that Peru can make further progress at prevention and treatment. For this reason, it is important to integrate IFA promotion activities by leveraging partnerships with private organizations and other community-level public programs to integrate nutrition into broader maternal health efforts. Not only do providers need a better way to monitor women's adherence to IFA supplementation needed, but an improved monitoring system to track anemia would also be extremely useful to really maximize MINSA's efforts.

As suggested by the providers who participated in this study, a home surveillance system to monitor consumption should be put in place to allow nurses and obstetricians to better follow women's adherence to the supplementation regimen and offer counseling that is tailored to each patient's individual situation. MINSA should establish an infrastructure in the form of required policies that incentivize providers to make home visits. Peru has recently reduced the role of *promotores* (community health workers) because they lack technical training, but this significantly underestimates their value for improving community health. *Promotores* could be utilized for conducting home surveillance, if they receive training to provide appropriate counseling to pregnant women in their communities who are taking IFA.

Local NGOs and government social programs such as *JUNTOS* and CARE Peru should include messaging about IFA supplementation in their pre-existing educational activities to reinforce the information women receive from providers. Because nutrition is such an integral part of anemia prevention, educational activities promoting the nutritional needs of women during pregnancy should continue to be offered. Currently CARE Peru conducts cooking demonstrations for mothers,

and women have to attend nutrition classes in order to receive their incentives from *JUNTOS*. Emphasizing the value of local products is very important, enabling families with limited economic means to best take advantage of accessible dietary resources.

In order to engage partners in women's IFA supplementation, *JUNTOS* could require that partners of pregnant women attend at least four of their ANC visits. Women who participate in the social program must comply with certain health care activities such as attending cooking demonstrations and bringing their children in for all rounds of immunizations, thus the extension of these requirements would easily fit into the existing framework. In this way MINSA can emphasize the role of partners in pregnancy care. A study by Hamad & Fernald (2010) showed that Peruvian women's participation in a microcredit program for five years was strongly associated with 0.3 g/dL higher Hb concentration than new clients and improved food security. CARE already has a microcredit program in Ayacucho, but *JUNTOS* could also incorporate microcredit into their strategy, though better monitoring of impact on health indicators would be necessary to show direct correlation with IFA supplementation.

5.5 Directions for future research

Along with the areas for future research that have been addressed above in the context of designing an effective social marketing campaign, additional research is also needed to understand women's real knowledge about anemia. While this study discovered that women have basic knowledge about anemia and how to take the supplements, many younger, first-time women did not understand the cause for anemia or ways to treat the disorder while older women who had children. It is necessary to identify these knowledge gaps in order to better target counseling messages that communicate to women in higher risk groups the importance of IFA supplements and preventing anemia during pregnancy. Because some women thought that the tablets were *medicamento* or medication, they feared that it would harm their baby and stopped taking the IFA tablets altogether. Thus it is important to disseminate the specific message that IFA tablets are supplements, or vitamins, and not medication, especially among younger women who are first-time mothers.

One important direction to be addressed during future research is the rates of maternal anemia among women who are enrolled in SIS compared to those outside of the national insurance network. This data could help determine the effect of the government-provided generic IFA tablets and develop appropriate strategies for improving iron stores among the two groups of women.

5.6 Conclusion

In Ayacucho, women's ability to adhere to IFA supplements is influenced by several main factors: side effects caused by the generic form of the IFA tablets, indigenous culture, older age and higher parity, late entry into prenatal care, lack of partner or family support, and MINSA's regulations surrounding supplementation. Current delivery activities such as distribution and education are primarily conducted in health institutions by providers, and thus provide room for social media strategies such as TV and radio advertising, text messaging campaigns, and alternative ways to promote IFA in communities.

This study provides a base of formative research that can be used to inform future programs in Peru and Latin America on how to integrate social marketing and community mobilization for the promotion of IFA supplementation. Additional research is needed to develop and pre-test social marketing activities among target audiences, but is promising for its potential to increase adherence to the IFA regimen.

Reducing maternal iron deficiency anemia improves women's productivity at both the household and community level, and prevents children from impaired cognitive and physical development. Increasing adherence to IFA supplements complies with MINSA's current supplementation program while reducing the accumulated waste of women throwing out unused tablets. Implementing a successful social marketing campaign and improving the supplementation program not only benefits women, but also the Peruvian government. Gaining the support of policymakers is crucial for enacting this change, and ultimately for improving the health of women and children.

REFERENCES

Adhikari, K., Liabsuetrakul, T. & Pradhan, N. (2009). Effect of education and pill count on hemoglobin status during prenatal care in Nepalese women: a randomized controlled trial. *J Obstet Gynaecol Res.* 35:459-466

Allen, L. (2000). Anemia and iron deficiency: effects on pregnancy outcome. *American Journal of Clinical Nutrition*, May; 71 (5): 1280S-1284S.

Alliance, I. H. A. (2006). *Tools Together Now: 100 participatory tools to mobilize communities for HIV/AIDS*. Brighton.

Bhutta Z., Ahmed T., Black R., Cousens S., Dewey K., Giugliani E., Haider B., Kirkwood B., Morris S., Sachdev H., Shekar M. Maternal and Child Undernutrition Study Group. (2008). What works? Interventions for maternal and child undernutrition and survival. *Lancet*. Feb 2; 371(9610):417-40.

Bothwell TH. (2000). Iron requirmentes in pregnancy and strategies to meet them. *Journal of Nutrition, 72*: 257S-64S.

Brabin B., Hakimi M., Pelletier D. Iron-Deficiency Anemia: Reexamining the Nature and Magnitude of the Public Health Problem. *American Journal of Nutrition*. Feb;131 (2): 604S-615S.

Charmaz, Kathy. (2006). *Constructing Grounded Theory: A Practical Guide Through Qualitative Analysis*. Thousand Oaks: Sage Publications.

Christian P, Khatry S.K., Katz J., Pradhan E.K., LeClerq S.C., Shrestha S.R., et al. (2003). Effects of alternative maternal micronutrient supplements on low birth weight in rural Nepal: double blind randomised community trial. BMJ. Mar 15;326(7389):571.

Christian P, Stewart CP, LeClerq SC, Wu L, Katz J, West KP,Jr, et al. (2009). Antenatal and postnatal iron supplementation and childhood mortality in rural Nepal: a prospective follow-up in a randomized, controlled community trial. *Am J Epidemiol*. Nov 1;170(9):1127-36.

Crape L, Kenefick E, Cavalli-Sforza T, et al. (2005). Positive Impact of a Weekly Iron-Folic Acid Supplement Delivered with Social Marketing to Cambodian Women: Compliance, Participation, and Hemoglobin Levels Increase with Higher Socioeconomic Status. *Nutrition Reviews*; 63:S134-S138.

Encuesta Demográfica y de Salud Familiar – ENDES. (2011). Indicadores de Resultado Identificados en los Programas Estrategicos 2000, Primer Semestre 2011. Lima.

Favin M., Griffiths M. (1991). Social Marketing of Micronutrients in Developing Countries. The Manoff Group for The Population and Human Resources Department, The World Bank.

Fishbein M., Capella J. (2006) The Role of Theory in Developing Effective Health Communications. *Journal of Communication, 56*: S1-S17.

Freire W.B. (2009). Strategies of the Pan American Health Organization World Health Organization for the Control of Iron Deficiency. *Nutrition Reviews*. 55(6): 183-188.

Galloway R., Dusch E., Elder L., Achadi A., Grajeda R., Hurtado E., Favin M., Kanani S., Marsaban J., Meda N., Moore K.M., Morison L., Raina N., Rajaratnman J., Rodriguez J., Stephen C. (2006) Women's perceptions of iron deficiency and anemia prevention and control in eight developing countries. *Social Science & Medicine, 55*: 529-544.

Galloway R., McGuire J. (1994) Determinants of compliance with iron supplementation: supplies, side-effects, or psychology? *Social Science & Medicine, 39*:381-90.

Garg A., Kashyap S. (2006). Effect of Counseling on Nutritional Status during Pregnancy. *Indian J Pediatr*.73(8):687-692.

Gillespie S., Kevany J., Mason J. (1991). Controlling iron deficiency. United Nations Administrative Committee on Coordination/Sub-Committee on Nutrition, State-of-the-Art Series Nutrition Policy Discussion Paper 9. Geneva: World Health Organization.

Hamad R. & Fernald L. (2010) Microcredit participation and nutrition outcomes among women in Peru. *Epidemiol. Community Health*. (10)1136.

Hayes-Bautista D. (1976). Modifying the treatment: patient compliance, patient control, and medical care. *Social Sciences & Medicine, 10*: 233-23.

Horton S., Ross J. (2003). The economics of iron deficiency. *Food Policy, 28*:51-75.

Hurrell R., Ranum P., de Pee S., et al. (2010). Revised recommendations for iron fortification of wheat flour and an evaluation of the expected impact of current national wheat flour fortification programs." *Food and Nutrition Bulletin*. (31)1: S7-S21.

International Nutritional Anemia Consultative Group (INACG). (18 November 2004). Report of the 2004 International Nutritional Anemia Consultative Group Symposium: Iron Deficiency in Early Life: Challenges and Progress. Lima, Peru.

IYCN. (2011). Building up the Blood: Barrier Analysis on a Maternal Iron-Folic Acid Supplementation Program in Madagascar. Antananarivo, Madagascar.

Jacques B, Thanh H, Cavalli-Sforza T, et al. (2005). Community Mobilization and Social Marketing to Promote Weekly Iron-Folic Acid Supplementation in Women of Reproductive Age in Vietnam: Impact on Anemia and Iron Status. *Nutrition Reviews*, S95-S108.

Kavle J., Stoltzfus R., Witter F., et al. (2008). Association between Anaemia during Pregnancy and Blood Loss at and after Delivery among Women with Vaginal Births in Pemba Island, Zanzibar, Tanzania. *Journal of Health Population Nutrition*. Jun:26(2):232-240.

Khan N, Thanh H, Berger J. (2005). Community Mobilization and Social Marketing to Promote Weekly Iron-Folic Acid Supplementation: A New Approach Toward Controlling Anemia Among Women of Reproductive Age in Vietnam. *Nutrition* Reviews; 63:S87-S94.

Klemm R., Sommerfelt A.E., Boyo A., Barba C., Kotecha P., Steffen M., and Franklin

N. (2011). Are We Making Progress on Reducing Anemia in Women? Cross-country Comparison of AnemiaPrevalence, Reach, and Use of Antenatal Care and Anemia Reduction Interventions. AED.

Lefebvre RC. (2000). In PN Bloom & GT Gundlach (Eds.), *Handbook of Marketing and Society*, Newbury Park, CA: Sage Publications.

Levin, H.M. (1986). A benefit-cost analysis of nutritional programs for anemia reduction. *The World Bank Observer, 1* (2), 219-246.

López de Romaña D., Salazar M., Hambidge K.M., Penny M.E., Peerson J.M., Krebs N.F., Brown K.H. (2005). Longitudinal measurements of zinc absorption in Peruvian children consuming wheat products fortified with iron only or iron and 1 of 2 amounts of zinc. *American Journal of Clinical Nutrition.* 81(3):637-647.

Mathers, C. D., C. Bernard, et al. (2003). "Global burden of disease in 2002: data sources, methods and results." Geneva, Switzerland, WHO.

McLean E., Cogswell M., Egli I., Wojdyla D., de Benoist B. (2009). Worldwide prevalence of anaemia: WHO Vitamin and Mineral Nutrition Information System, 1993–2005. *Public Health Nutrition, 12*:444-54.

McNulty J. (January 2011). Technical Assistance for Behavior Change: Window of Opportunity, CARE Peru.

Measure DHS. (May 2011). Peru: Encuesta Demografica de Salud Familiar – ENDES Continua, 2009.

Miller M.F., Stoltzfus R.J., Mbuya N.V., Malaba L.C., Iliff P.J., Humphrey J.H., et al. (2003). Total body iron in HIV-positive and HIV-negative Zimbabwean newborns strongly predicts anemia throughout infancy and is predicted by maternal hemoglobin concentration. *J Nutr.* Nov;133(11):3461-8.

Ministerio de Salud (MINSA). (2012). Población estimada por grupos de edad, según provincia y distrito, Departamento de Ayacucho – Año 2012. Retrieved April 6, 2012, from http://www.minsa.gob.pe/estadisticas/estadisticas/Poblacion/Poblacion Marcos.asp?05

Munayco E. C., Gambirazio C. C., Suarez O. L., Arias R. L. (2009). Estudio de adherencia a la suplementacion con hierro durante la gestacion en las direcciones de salud de Apurimac y Ayacucho. Lima; Ministerio de Salud; Direccion General de Epidemiologia.

Murray C., Lopez, A. (eds.). (1996). The Global Burden of Disease (Vol. 1). World Health Organization, Geneva, Switzerland.

Norell S. (1981). Accuracy of patient interviews and estimates by clinical staff in determining medication compliance. *Social Science & Medicine, 15E.* 5761.

O'Brien K.O., Zavaleta N., Abrams S.S., Caulfield L. (2003). Maternal iron status influences iron transfer to the fetus during the third trimester of pregnancy. *American Journal of Clinical Nutrition, 77*; 924-30.

Olude O.A. (2011). Impact of Nutrition Education and Counseling on Anemia Prevalence

and Iron Status in Women of Reproductive Age: a Systematic Review. Available from Emory Electronic Theses and Dissertations database.

Peña-Rosas JP, Viteri FE. (2009). Effects and safety of preventive oral iron or iron and folic acid supplementation for women during pregnancy. *Cochrane Database Systematic Review; Oct 7;(4)*(4):CD004736.

Norell S. (1981). Accuracy of patient interviews and estimates by clinical staff in determining medication compliance. *Social Science Medicine, 15E*. 57-61.

Pan American Health Organization (PAHO). (2008). Anemia among adolescent and young adult women in Latin America and the Caribbean: A Cause for Concern. *PAHO & WHO Adolescent Nutrition*.

Rush D. (2000). Nutrition and maternal mortality in the developing world. *American Journal of Clinical Nutrition*. 72(supp): 212S-240S

Sacco L.M., Caufield L.E., Zavaleta N., Retamozo L. (2003). Dietary pattern and usual nutrient intakes of Peruvian women during pregnancy. *European Journal of Clinical Nutrition, 57*: 1492-1497.

Sanghvi T.G., Harvey P.W., Wainwright E. (2010), Maternal iron-folic acid supplementation programs: Evidence of impact and implementation. *Food and Nutrition Bulletin*, 31: 2 (supplement), The United Nations University.

Scrimshaw S., Zambrana R., Estupinan S., Luna R., Rivera H. (1990). Mass Communications/education Strategies for Improvement of Prenatal Health Behaviors in Mexico. *Maternal Nutrition and Health Care Program Research Report Series, Report No. 4*, International Center for Research on Women.

Seck B.C., Jackson R.T. (2007) Determinants of compliance with iron supplementation among pregnant women in Senegal. *Public Health Nutrition, 11*(6), 596-605.

Senanayake, H.M., Premaratne S.P., Palihawadana T., Wijeratne S. (2010). Simple educational intervention will improve the efficacy of routine antenatal iron supplementation. The Journal of Obstetrics and Gynaecology Research. 36(3):646-650.

Sistema Integrado de Suministro de Medicamentos e Insumos Médicos (SISMED). (2012). Retrieved April 6, 2012, from http://www.sismed.minsa.gob.pe/.

Stoltzfus R., Mullany L., Black R. (2004). Iron deficiency anemia. In M. Ezzati, A.D. Lopez, A. Rodgers. C.J. Murray (Eds), Comparative Quantification of Health Risks: Global and Regional Burden of Disease Attributable to Selected Major Risk Factors, Volume 1 (pp 163-210). World Health Organization, Geneva.

Storey D., Lee K., Blake C. et al. (2011). Social & Behavior Change Interventions Landscaping Study: A Global Review. Summary report reviewing existing evidence and data on Social & Behavior Change interventions across the RMNCHN spectrum. Department of Health, Behavior & Society, Johns Hopkins Bloomberg School of Public Health.

Titaley C.R., Dibley M.J., Roberts C.L., Agho K. (2010). Combined iron/folic acid

supplements and malaria prophylaxis reduce neonatal mortality in 19 sub-Saharan African countries. *Am J Clin Nutr*. Jul;92(1):235-43.

United Nations. Millennium Development Goals, Maternal Health. http://www.un.org/millenniumgoals/maternal.shtml. Accessed December 15, 2011.

UNICEF/UNU/WHO/MI Technical Workshop. (1998). Preventing iron deficiency in women and children: background and consensus on key technical issues and resources for advocacy, planning, and implementing national programmes. New York.

Viteri FE. (1994). The consequences of iron deficiency and anemia in pregnancy. Allen L, King J, Lonnerdahl B, eds. *Nutrient regulation during pregnancy, lactation and growth*. New York: Plenum Press.

World Health Organization (WHO). (2001). UNU. Iron deficiency anaemia: assessment, prevention, and control. A guide for programme managers. Geneva.

World Health Organization (WHO). (2007). Iron and folate supplementation. Standard no. 1.8. *Standards of maternal and neonatal care*. Making pregnancy safer initiative. Geneva.

World Health Organization (WHO). (2008). Worldwide prevalence of anemia 1999-2005. WHO Global Database on Anemia.

World Health Organization (WHO). (2009). Weekly Iron-Folic Acid Supplementation (WIFS) in Women of Reproductive Age: Its role in promoting optimal maternal and child health. *Department of Nutrition for Health and Development (NHD)*.

World Health Organization (WHO). (2010). Micronutrient deficiencies, Iron deficiency anaemia. Geneva.

Zavaleta N., Caulfield L.E., Garcia T. (2000) Changes in iron status during pregnancy in Peruvian women receiving prenatal iron and folic acid supplements with or without zinc. *American Journal of Clinical Nutrition,* 71: 956-961.

Zeng L., Dibley M.J., Cheng Y., Dang S., Chang S., Kong L., et al. (2008). 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*. Nov 7:337

Zimmermann, M. B. and R. F. Hurrell (2007). "Nutritional iron deficiency." Lancet 370(9586): 511-520.

APPENDIX

Code book used during analysis	
Code	**Code Description**
Anemia	Situation of anemia in the region. Includes reference to Hb levels. Do not include treatment regimen related to supplements. - Things to look for specifically: What do providers think are the main factors contributing to anemia? What impact do providers identify anemia as having on a woman's pregnancy and birth outcome? - Vital questions to answer: What is the level of gravity of anemia among the population? How does anemia affect women?
Protection against anemia	What a woman can do to protect herself from anemia: nutrition, supplements, or otherwise
Causes	Patient and provider perceptions of causes of anemia (i.e. diet, poverty, health status of women)
Symptoms	Patient and provider perceptions of symptoms of anemia
Prevalence	Patient and provider perceptions of how common anemia is in the community
Impact	Patient and provider perceptions of impact that anemia has on an individual, their family, or community (micro and macro levels)
IFA Supplement	Patient and provider perceptions of aspects related to IFA supplements. - Vital question to answer: What are the strengths and weaknesses of the IFA supplementation program?
Physical presentation	Size, smell, taste, color of IFA tablets
Positive experience	Patients and providers that express a positive experience with IFA (i.e. no side effects, overall contentment)
(Mis)trust in supplement	Patients express trust or mistrust in the supplement; providers perception of patients (mis)trust in IFA tablets
Free cost	Patient and provider opinions about IFA supplements being offered for free
Stock/Supply	Whether or not quantities available at health establishes are sufficient
Supply Chain	Knowledge of patients or providers about distribution and supply chain from SISMED and MINSA to health establishments
Regimen	Duration, dosage, administration of IFA
Alternative supplements	Any discussion by patients or providers about other kinds of iron supplements bought by patients that are not those provided by the government for free (*Madre*, *Natal*)
Recommendations for how to improve program	Recommendations from patients and providers for specific improvements
Adherence	Factors affecting a woman's ability to adhere to the prescribed supplementation regimen. - Vital question to answer: What are the barriers and facilitators influencing pregnant women's adherence to IFA supplements?
Reminders	What techniques women employ to remember to take their IFA supplements or difficulties that women face in remembering
Side effects	Any side effects besides nausea that patients and providers acknowledge as resulting from supplements (IFA or alternatives) - Things to look for specifically: color of urine, constipation, change in appetite

	- Vital question to answer: What do patients tell their obstetricians about the side effects that they dislike about the IFA supplements that cause them to stop adherence?
Nausea/Asco	Women feeling nauseous, also without desire to eat or with vomiting. Either caused by symptoms of pregnancy or from taking IFA
Partner support	Positive effects that a partner's support has on a woman's adherence to IFA regimen; includes partner awareness of importance of IFA. Does not include a partner's control over women's health decisions - Things to look for specifically: Does a woman's partner accompany her to her ANC visits? - Vital question to answer: How is a partner's support important for improving her adherence to IFA supplements?
Counseling	Any reference to counseling given by providers to patients during ANC visits. - Things to look for specifically: What counseling techniques do providers consciously provide to patients regarding IFA supplements? - Vital question to answer: How does counseling affect a woman's adherence to IFA supplementation?
Trust in provider	Patient and provider perceptions about the importance of a patient's trust in her provider
Sensitizing patient	Raising awareness among women about the importance of IFA so they have the necessary knowledge to take the tablet. "*Sensibilizar*" in Spanish. Do not use in other contexts outside of anemia and supplementation. - Vital question to answer: What are women being told about the importance of IFA during the counseling that takes place in ANC visits?
Monitoreo	Provider's ability or inability to monitor whether or not their patients are taking their supplements (adhering to supplementation regimen). This includes baseline evaluation of anemia levels of patients to be able to monitor change over course of supplementation program, and suggestions for how to improve the current monitoring practices. Do not use for monitoring during home visits. - Vital questions to answer: What are successful ways that providers can monitor whether or not their patients are taking their IFA supplements?
Home visits	Any mention of home visits as a recommendation for how providers can improve women's adherence to IFA supplements. This is a sub-code for monitoring because it is a specific type of monitoring that the providers can conduct. Use for need for more personnel to conduct home visits. - Vital questions to answer: Would home visits from a health care provider positively influence a woman's decision to take her iron supplements and reduce the prevalence of anemia?
Nutritional requirements	The influence that nutrition has on iron deficiency anemia. Includes the providers' perception of the nutritional requirements that a woman needs during pregnancy and whether or not their patients are meeting these requirements. - Vital questions to be answered: What are the barriers and facilitators to proper intake of iron-rich foods during pregnancy?

Patient characteristics	Specific demographic characteristics of the patients such as but not limited to culture, language, and health practices that the providers identify (as possibly being different than their own). - Things to look for specifically: What patient characteristics are identified by providers to facilitate or inhibit access to ANC services or adherence to IFA? - Vital questions to answer: How do the cultural characteristics of patients affect their decision to access health care and take IFA supplements
Economic situation of mothers	How the household economy affects nutritional status of women.
Health is not a priority	General understanding, on behalf of the providers, and examples that their patients do not value their health. Can be specific to indigenous culture. - Things to look for specifically: What factors do providers notice that inhibit their patients' decision to access health services? - Vital questions to answer: What are larger cultural issues that need to be addressed in order to ensure that women understand the value of taking their IFA supplements?
Adolescents	Role that adolescence plays in anemia and IFA supplementation
Participation in *JUNTOS*	How participation in the conditional cash transfer program (and receiving free food baskets) affects anemia and supplementation
Entry into ANC	Experience (including difficulties) that women face when entering ANC. Reasons for not having adequate number of visits, timing of entry, how this affects supplementation regimen.
Previous pregnancies	For multiparous women, experience during previous pregnancies. Includes experience with IFA (whether they took it or not).

Focus Group Discussion Guide

Grupos Focales con las madres

Criterio de inclusión: +16 meses de embarazo, han recibido a lo menos un control prenatal a la fecha y han tomado una vez los suplementos de sulfato ferroso (con este embarazo o con previo).

Preguntas exploratorias

-- ¿Cuál es su edad?

-- ¿Cuántos niños/as tiene?

--¿Cuántos meses de embarazo lleva?

--¿Cuántos controles prenatales ha tenido a la fecha?

-- ¿De qué comunidad viene?

-- ¿Es beneficiaria de un programa social (Juntos, Vaso de Leche, Comedor, etc.)?

Reglas del grupo:

> --No hay una respuesta equivocada, estamos aquí para aprender de las demás y cada persona tiene su experiencia distinta.
>
> --Vamos a crear un círculo de confianza aquí hoy día entre nosotras. Lo que dicen aquí debe ser guardado y que no salga de este círculo. No queremos contar chismes ni juzgar a las opiniones o experiencias de las demás.

Preguntas claves

Vamos a empezar introduciéndonos al grupo. Por favor de contarnos su nombre, cuántos hijos tienen y cuántos meses de embarazo llevan.

Muy bien, muchísimas gracias. Ahora que nos conocemos, vamos a hacer una actividad acerca de la experiencia que están teniendo con el embarazo.

Nutrición

Para empezar, tocamos el tema de la nutrición. Voy a pasar por cada una de ustedes para saber qué alimentos están comiendo ustedes. (Pasar una por una)

¿Cuáles de estos alimentos son mejores para una mujer consumir durante su embarazo? (poner un círculo alrededor de estos alimentos) ¿Hay algunos alimentos que son muy buenos que consumir que no tenemos aquí? ¿Cuántas veces a la semana deben consumir ellas estos alimentos buenos?

Ahora me gustaría saber ¿Cuáles personas les influyen su alimentación?

¿Cuáles otros factores determinen lo que consuma una mujer mientras está gestando?

Muchas gracias.

Anemia

Ahora vamos a conversar sobre los problemas que una mujer embarazada puede experimentar. ¿Cuáles son algunos de los problemas que pueden pasar a una mujer embarazada?

¿Anemia?

-- ¿Qué han escuchado usted acerca de la anemia?

--las causas, los problemas para la madre/bebé binomio, fuente de información educativa

-- ¿Qué han escuchado acerca de cómo las mujeres pueden prevenir la anemia?

ACTIVIDAD: Árbol de Problemas

Ahora vamos a participar en otra actividad breve. Vamos a utilizar un dibujo de las diferentes partes de un árbol para identificar los problemas relacionados con los problemas que experimentan las gestantes que toman los suplementos.

Primero vamos a hacer un gran dibujo del tronco de un árbol. En el tronco se va a escribir el tema central: tomar los suplementos de hierro durante el embarazo.

Ahora vamos a llenar en las **raíces** del árbol.
-- ¿Cuáles son algunas de las causas de la anemia? ¿Qué son algunos de los síntomas que experimenta una mujer anémica?

La siguiente parte del árbol que vamos a dibujar son las **ramas**.
¿Qué puede hacer una mujer para prevenir la anemia?

(Enfocarse en los suplementos de sulfato ferroso")

-- ¿Cuántos de ustedes alguna vez han tomado suplementos de sulfato ferroso?
--¿Cómo consiguen los suplementos?
--¿Cómo les parece los suplementos (color, olor, sabor, tamaño)?
-¿Qué personas las apoyan para tomar los suplementos?
--Esposos, mamas, suegras, personal de salud, otros familiares
-¿Qué personas no las apoyan para tomar los suplementos? ¿Por qué?

Ahora que hemos creado las ramas, vamos a pasar a las **hojas**.
--¿Qué son algunas actividades que las mujeres embarazadas en esta comunidad pueden hacer para facilitar la prevención de la anemia?

Suplementación: ¿Cómo podemos mejorar la toma de los suplementos durante el tiempo recomendado para manera de prevenir la anemia?

Nutrición: ¿Cómo podemos mejorar el consumo de estas comidas que contienen mucho hierro?

-- En resumen, ¿Qué está pasando en nuestro árbol sobre el consumo de suplementos de hierro?

Muchísimas gracias por su participación. Ahora vamos a cerrar nuestra conversación con un sello del círculo de abrazos. Cada una tenemos que abrazarles a las demás.

Interview guide for mothers

Entrevista a profundidad con las madres

Preguntas exploratorias

-- ¿Cuál es su nombre señora?

-- ¿Cuál es su edad?

-- ¿Cuántos embarazos ha tenido?

-- ¿Cómo se llaman sus niños y edad?

-- ¿Es beneficiaria del programa JUNTOS?*

-- ¿Cuánto tiempo de embarazo tiene usted?

-- ¿Cuántos controles prenatales ha recibido a la fecha?

-- ¿Qué persona la acompaña a su control prenatal?

Preguntas de la investigación

La anemia

-- ¿Qué ha escuchado acerca de los problemas que puede tener una mujer durante su embarazo?

--¿Dónde va usted para recibir ayuda sobre estos problemas?

--¿Qué ha escuchado usted acerca de problemas durante el embarazo que afectan su sangre?

-- ¿Cómo se llama este problema? ¿Cuáles son los síntomas?

- Cansancio, debilidad, mareada, dolor de cabeza

-- ¿Qué tan común es la anemia entre las mujeres de su comunidad?

-- ¿Ha escuchado de ciertos problemas que puede ocurrir una mujer embarazada si está anémica?

-- ¿Qué ha escuchado acerca de cómo las mujeres pueden prevenir la anemia?*

- Suplementos, consumo de alimentos de origen animal

Suplementos de hierro

-- Alguna vez ¿ha tomado usted suplementos?

-- ¿Cuándo tomó los suplementos de hierro por primera vez?

-Está embarazo: ¿qué mes?

-Embarazo previo, ¿qué mes?

--¿Cuándo es la última vez que ha tomado un suplemento?

-- ¿Qué suplemento ha tomado?

--¿Por cuánto tiempo consumió usted el suplemento durante su último embarazo? (Las que no son primerizas)

--¿Paró de tomar los suplementos antes del final del régimen? ¿Por qué?

--¿Qué hace usted con los suplementos que no toma?

--¿Tuvo algún problema mientras tomó los suplementos? ¿Qué?

--Constipación, diarrea, nausea, vómitos, mareos, dolor abdominal, sabor

-- Mientras tuvo usted estos problemas, ¿hizo algo para sentirse mejor?

-- ¿Tomó los suplementos con algún tipo de alimento?

-- ¿A qué hora del día tomó usted los suplementos?

-- ¿Cuántas veces al día?

Le voy a preguntar algunas preguntas acerca de los suplementos:

--¿Qué cambios en general, en tu vida, ha sentido al tomar los suplementos?

-- ¿Notó usted un cambio de su salud después de tomar los suplementos? ¿Qué cambios?

-- ¿Por cuánto tiempo estaba tomando los suplementos antes de notar este cambio?

-- ¿Cómo se siente al tomar los suplementos?
- Tamaño, sabor, color

-- ¿Dónde obtiene los suplementos?

-- ¿Cuántos suplementos le entregan cada mes?

-- ¿Con cuanta frecuencia tiene que regresar para recibir más suplementos?

--¿Qué opina sobre la entrega de los suplementos?

-- ¿Me puede contar que dijo la persona que le entregó los suplementos acerca de cómo tomarlos?

-cuando, por cuanto tiempo, cuantos, qué hacer con los efectos, razón por tomarlos, cuando volver para más, explicación de los efectos

-- ¿Siguió esta consejería? ¿Por qué si o no?

Decisiones e influencias sobre la toma de los suplementos

--¿Quién influye en su decisión para tomar los suplementos?

--¿De quién quiere recibir información sobre la toma de los suplementos?

--¿Qué información recibe de estas personas?

-- Cuando asiste usted los controles prenatales, ¿qué le dice el personal de salud acerca de los suplementos?

-- ¿Por qué decidió usted tomar el suplemento?

-- En su hogar ¿Quién sabe que está tomando los suplementos? ¿Qué opinan sobre los suplementos?

-- ¿Qué hace para recordar tomar los suplementos?

-Calendario, hora de comer, al levantarse/acostarse

-- ¿Quién le ayuda a recordar tomar los suplementos?

-Esposo, suegra, tiempo

-- Existe alguna persona de su entorno que no está de acuerdo que tome los suplementos ¿Quién?

Clausura

-- ¿Quién toma la mayoría de las decisiones sobre la salud de su familia?

-- ¿Cuáles decisiones hace usted en el hogar?

-- ¿Hay algo más que quiere compartir conmigo acerca de los temas que hemos discutido?
-- ¿Tiene alguna pregunta sobre cualquier lo que hemos conversado?

Interview guide for partners

Entrevista a profundidad con los esposos

Preguntas Exploratorias

-- ¿Cuál es su edad?

-- ¿Cuántos embarazos ha tenido su esposa/nuera/hija?

-- ¿En qué mes del embarazo está su esposa/nuera/hija?

-- ¿Es beneficiaria del programa JUNTOS?

Preguntas Claves

-- ¿Le habla a su esposa/nuera/hija sobre la situación del embarazo? ¿Tienen algunos problemas? ¿Qué le aconseja a ella?

-- ¿Quién le podría ayudar a resolver esta problema?

-- ¿Han escuchado sobre unos problemas durante el embarazo que son causados por la sangre, una falta de sangre o la pérdida de sangre?

--¿Han escuchado acerca de un problema de salud que se llama la anemia? ¿Qué me pueden contar sobre la anemia?

-- ¿Ha tenido anemia alguien que conocen de esta comunidad?

--¿Qué puede hacer la gente de esta comunidad para prevenir la anemia? ¿Qué tipo de prevención se puede hacer?

-- ¿Ha hecho su esposa/nuera/hija algunas de estas cosas? ¿Qué le pasó?

-- Algunas mujeres toman suplementos de hierro durante el embarazo. ¿Qué han escuchado de estos suplementos?

-- ¿Qué han escuchado sobre porque toman estos suplementos? ¿Dónde escucharon esto?

-- ¿Ha tomado su esposa/nuera/hija estos suplementos alguna vez?

--¿Dónde consiguió estos suplementos?

--¿Por cuánto tiempo tomó estos suplementos?

-- ¿Por qué dejó de tomar los suplementos?

-- ¿Qué le contó su esposa/nuera/hija mientras estaba tomando estos suplementos?

-- ¿Notó un cambio en la salud durante o después de que ella estaba tomando los suplementos? ¿Cuáles?

-- ¿Piensa que es necesario para las mujeres tomar los suplementos durante el embarazo? ¿Por qué?

Interview guide for providers

Entrevista a profundidad con personal de salud

Apertura

Para empezar, me gustaría conocer acerca de su trabajo.

• Duración, responsabilidades

Preguntas clave

Me gustaría hablar acerca del tema de la deficiencia de hierro y la anemia de las mujeres en Ayacucho y las actividades específicas que realiza respecto a este tema.

--¿Qué intervenciones se realizan en su ámbito para proteger el estado nutricional de las gestantes?

--En su opinión, ¿cuáles factores contribuyen principalmente a la anemia materna?

• enfermedades infectuosas endémicas, la situación económica de las familias, la carga de trabajo de las mujeres

-- Entiendo que se administra a las gestantes suplementos de hierro durante 6 meses de su embarazo y puerperio. Por favor cuénteme cómo ha funcionado esta intervención en su ámbito en comparación a otros distritos.

-- ¿Qué tipo de actividades educativas realiza para proteger de la anemia a la gestante?

• Comunitaria, a los promotores de salud, al personal de salud

-- ¿Qué dificultades ha enfrentado al personal de salud para la administración de los suplementos?

-- ¿Cuáles cambios cree usted que merecen ser considerados para mejorar la administración de suplementos?

-- ¿Qué éxitos ha tenido con la administración de los suplementos?

-- ¿Qué ha aprendido usted sobre la deficiencia del hierro a través de esta actividad de suplemento?

-- Háblеme de la cadena de suministro de tabletas de hierro en este establecimiento.

-- ¿Qué dificultades ha enfrentado el establecimiento con los programas de promoción de los suplementos de hierro?

-- ¿Cómo encaja la anemia materna (y específicamente los suplementos de hierro) en los planes futuros de la DIRESA?

-- ¿De qué manera colabora DIRESA con la red de salud y las organizaciones no gubernamentales sobre el tema de la deficiencia de hierro y de la anemia?

--¿Qué recomendaciones haría para mejorar la suplementación de hierro de las gestantes?

Clausura

-- ¿Hay algo más que quiera compartir conmigo?

-- ¿Tiene alguna pregunta sobre lo que hemos conversado?