

Increasing Women's Involvement in Community Decision-Making:

A Means to Improve Iron Status

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Introduction

Many at-risk populations in developing countries are deficient in iodine, iron, and vitamin A, making them more vulnerable to illness, fatigue, blindness, and memory loss, and increasing the possibility of mental retardation among their children. Enhancing these micronutrients can result in improved well being and physical development. For instance, infants and pre-school children have greater chances of survival, better health, and increased intellectual capacity. Women may have improved pregnancy outcomes and increased productivity. Supplementation, food fortification, dietary diversification, nutrition education, and food production are strategies that have been developed to reduce these micronutrient deficiencies, and have, for the most part, demonstrated positive, though uneven, results. For instance, recent data indicate progress worldwide in combating vitamin A deficiency; however, subclinical deficiencies of this micronutrient remain uncontrolled. Further, iron deficiency anemia continues to affect as many as 43 percent of women and 34 percent of men globally (ACC/SCN 1997), with widely divergent regional differences in rates. In order to achieve virtual elimination of vitamin A deficiency by the Year 2000, and to reduce iron deficiency anemia among women of reproductive age and young children by one-third of 1990 levels, continued efforts must be made to strengthen and enhance these intervention strategies.

The International Center for Research on Women (ICRW), a nonprofit policy research institution that promotes economic and social development with women's full participation, attempted to address these issues through a two-year intervention research program implemented in five countries. Working with partners in Ethiopia, Kenya, Peru, Tanzania, and Thailand, ICRW undertook a series of studies to explore ways to strengthen women's contributions to reducing iron and vitamin A (and to a lesser extent iodine) deficiencies by combining women's productive and reproductive activities. The idea was to tap into women's roles as income-earners and food producers on the one hand, and as food processors and care givers on the other. Community members, particularly women, drew on their knowledge and experiences to develop and implement solutions to micronutrient deficiency problems in their communities. The studies were supported by the Opportunities for Micronutrient Interventions (OMNI) Research Project, managed by the International Life Sciences Institute (ILSI) and funded by the United States Agency for International Development (USAID).

The five studies were carried out in Ethiopia, Kenya, Peru, Tanzania, and Thailand. In **Ethiopia**, the goal was to improve vitamin A status among women and young children. Building on women's involvement in a dairy goat project, nutrition specialists worked with women's groups and elementary school teachers and students to improve food preparation and feeding practices, and production of vitamin A-rich foods. Menus were developed that used locally produced vitamin A-rich foods and promoted the use of cooking oils to enhance absorption of vitamin A. Women, students, and teachers received seeds and were trained in techniques to expand home and school gardens. Further, health and nutrition education lessons raised community members' and school personnel's awareness of the links between food consumption and health.

In **Kenya**, a new variety of sweet potato rich in beta carotene was introduced to women farmers. The Kenya Agriculture Research Institute provided planting materials, and agricultural extension agents trained women in methods for growing and harvesting the sweet potato, post-harvest processing, and preparation techniques. In addition, health and nutrition education sessions were conducted to heighten awareness of the contribution vitamin A makes to children's health and development, and to encourage consumption of food products using the new sweet potato variety. The intention was to create supply and demand for the new food products — in the household and for market sales.

In **Tanzania**, the focus was on the adoption of new home-based solar food dryers to increase year-round availability of vitamin A-rich foods. The dryers were adaptations of earlier models and were designed to be more cost effective and accessible. Community members provided all the materials for constructing their household dryers. The research project trained local artisans to construct and maintain the dryers, and provided a short-term incentive to artisans to conduct home visits. Nutrition and health education and business training for marketing surplus production of solar dried vitamin A-rich foods and food products complemented this technology intervention.

In **Thailand**, the team built on experience from an earlier social marketing intervention that increased production and consumption of the ivy gourd plant and other foods rich in vitamin A. Building on that experience, the team trained women leaders in problem-solving methods and community mobilization techniques. The women then organized their communities to develop and implement plans of action to improve iodine, iron, and vitamin A status. The project provided small seed grants to support the costs for implementing some of the community-based actions, including food production, local preparation and sale of iodized salt, and health and nutrition education.

This report summarizes the findings from the intervention research project implemented by the Center for the Study and Promotion of Nutrition (CEPREN) in **Peru**. The study was designed to explore the use of participatory methodologies to engage women members of community kitchens in peri-urban Lima in the design, implementation, and evaluation of a trial intervention to reduce iron deficiency among women of reproductive age. The intervention trial focused on improving the quality of service in terms of nutritional content of meals and management practices, such as instituting quality assurance checks on meal preparation and kitchen hygiene, and stimulating demand for these innovations through health and nutrition education.

Background

Building on responses developed in the 1970s and 1980s to severe economic crises, the Peruvian government took on the enormous challenge of reducing by half the extreme poverty status of approximately 4.7 million people by 2001. Although hunger fell from 54 percent in 1991 to 47 percent in 1994, while extreme poverty declined from 22 percent to 18, one in every five Peruvians still suffered from hunger, according to the National Quality of Life Survey (Instituto CUANTO 1994).

The Peruvian government has offered diverse responses to the problems of food insecurity and malnutrition, mostly directed towards increasing food availability and accessibility, especially among low-income families. The government is also concerned about reducing iron deficiency in the most vulnerable populations. Actions taken to address this issue include wheat flour fortification and iron supplementation to pregnant women. These activities are partially carried out through health services and complementary food programs. However, the majority of these national programs lack proper organization and the information necessary to make these interventions effective and efficient, and to demonstrate their effects on at-risk populations.

Lima remains the focal point for internal migration from outlying rural areas. Currently one-third of the Peruvian population is concentrated in Lima, which generates approximately half the total gross domestic product. Despite this apparent wealth, the income distribution is highly skewed. Nearly half of the Peruvian population lives on less than US\$1 per day (World Bank 1997). Hyperinflation, economic stagnation, and a pervasive lack of access to basic services has led the urban poor to organize collectively to meet their needs and to confront their food insecurity.

Women in Peru

It is widely believed in Peru that women's traditional roles focus principally on caring for family members' nutrition, health, development, and general well-being. These productive roles typically are conducted within their homes or immediate surrounding neighborhoods. But Peruvian women have also contributed to household income, either providing unpaid labor or supporting small scale, often family-owned, income-earning activities. However, beginning in the 1950s, there was a significant increase in women entering the labor market, reaching 40 percent of the economically active population in the 1990s. Some women chose occupations in the service sector that drew on the skills they had developed in meeting their household responsibilities, while an appreciable number took positions as technicians and professionals. Although the division of labor has become more flexible, it is still a common perception that women's primary responsibilities are to work at home and support the family's needs.

At the same time that more women were entering the labor force, the 1970s heralded the debut of the women's social movement as an active part of civil society. Women seized upon these new organizational and social openings to organize community kitchens and other social support services to mediate the effects of the economic downturn on themselves and their families. By moving beyond their traditional household-circumscribed roles into the public sphere and gaining recognition from the government and external donors for their efforts, these women began to build their own networks and realize their collective potential for initiating change in their communities.

Notwithstanding those changes, women's educational achievements and health status continue to lag behind other countries in the region. Peru has a larger gender gap in adult literacy (87 women for every 100 men) than all other Latin American countries with the exception of Bolivia (84 per 100) and Guatemala (78 per 100). Similarly, Peruvian women have a life expectancy of 69 years—lower than other Latin American countries except for Bolivia (66 years) and Haiti (60 years)—and they have a higher fertility rate (3.2 children) than the regional average of 2.8 (Sivard 1995). Thus, although women may be moving more into the public sphere and organizing themselves to improve conditions for themselves and their families, health and nutrition indicators suggest the results of these initiatives are yet to be fully realized by women.

Nutritional Problems

Anemia poses a significant health problem in Peru affecting diverse populations in both rural and urban areas. Anemia is of particular concern for children and women of reproductive age. Prevalence of anemia in metropolitan Lima for all adult women in 1975 was 25 percent. By 1996 data from the ENDES III study indicated a prevalence rate of 36 percent (Instituto Nacional de Estadística e Informática 1997). A 1990 study found that 80 percent of pregnant women in the Maternity Hospital of Lima were anemic (Pardillon 1990). More detailed data are included in a 1992 survey conducted by the Metropolitan Lima-ENBIO study (unpublished), by Asociación Benéfica PRISMA, a local NGO working on health and nutrition programs. Results found that 17 percent, 32 percent, and 30 percent of mothers with children under age three, from high, middle and low economic strata, respectively, were anemic.

While a variety of factors contribute to endemic anemia, evidence suggests that a principal factor is the lack of iron-rich and iron-enhancing foods in people's diets. A study carried out by Dr. Chiriboga Collazos and collaborators 40 years ago indicated that a considerable percentage of the Peruvian population had an iron intake lower than recommended. This information was confirmed by the National Survey of Food Consumption that

found that 37 percent of families nationwide were meeting less than 90 percent of their recommended daily iron requirements (Ministerio de Agricultura 1972). More recent data, with a more limited focus, reveals a deterioration in iron intake—87 percent of pregnant women in metropolitan Lima received less than 50 percent of daily iron requirements as recommended by the Food and Agriculture Organization and the World Health Organization (1991).

Based on the assessment of dietary patterns and consumption levels in metropolitan Lima by the Instituto de Investigación Nutricional, the average intake of pregnant women was estimated to be 13.4 mg of iron per day, only 35 percent of FAO/WHO recommendations (Zavaleta et al. 1993). The assessment also indicated that less than one percent of pregnant mothers met their recommended iron intake, fewer than two percent received 80 percent, and only 13 percent met half of their recommended iron intake levels.

Following the economic adjustment measures of recent years, analysis of food intake found that the population had reduced its red meat consumption by 44 percent, poultry by 49 percent, and meat by-products by 71 percent in an attempt to reduce the drain on household budgets (Instituto Cuanto 1990). These reductions were more dramatic in the lower income population, which cut its consumption of red meat by 54 percent, poultry by half, and meat by-products by 83 percent.

Activities Underway to Reduce Micronutrient Deficiencies

One of the government intervention strategies designed to reduce iron deficiency is the provision of iron sulfate supplements for pregnant women as part of the health centers integrated care system. This strategy, however, benefits only 20 percent of pregnant women, most likely as a result of poor accessibility of health services. Other strategies include food fortification through complementary food programs for school children, and the "glass of milk" program using a hot cereal enriched with micronutrients designed to target children under three and pregnant women. In addition, the government enacted a decree on

August 26, 1996, to fortify wheat flour with iron. PANFAR, a joint project of PRISMA and the Ministry of Health distributes enriched foods to poor families through the Ministry of Health and reaches 500,000 beneficiaries. The private sector has taken action as well by producing cookies fortified with iron sulfate that are distributed through social compensation programs.

Community Kitchens

The first community kitchens (*comedores populares*) were created in Lima in 1978 as the debt crisis, hyperinflation, and economic contraction exposed a large number of the urban working class to poverty and food insecurity. The central government and international donor agencies, often through intermediary organizations such as CARE or Catholic Relief Services (Caritas), donate food. Women combine the rations and prepare meals five days a week, three times a day, with the principal meal being the mid-day meal. The food is taken home and shared with other family members or, to a lesser extent, consumed at the kitchens. This group-level activity is intended to reduce women's time burdens in preparing family meals, thereby increasing time available for engaging in economic activities. Although there is some semi-autonomous decision-making at the level of the individual kitchens, a Central Coordinating Committee ensures standards of operations and services among all kitchens. Women's groups continue to be the principal means for managing and providing services through these kitchens.

Beginning in the early 1990s, the Peruvian central government implemented an economic adjustment strategy designed to reduce the debt burden, pare down government budgets, and bring the external accounts into balance. Almost 6,000 community kitchens were created between 1991 and 1994, offering services to an excess of 600,000 people. As a result, the kitchens' members have grown into a vast network of alliances that have their own organizational structure and participate in national and regional federations. And through their involvement in the kitchens, women have become community activists and business managers.

However, with increased economic pressures on the government resulting from adoption of structural adjustment policies, the kitchens were pressured into finding means to sustain their services in the absence of or with reduced support from external donors. This directly affected the quality and quantity of meals and reduced the number of people served.

Studies in community kitchens report that the rations in the community kitchens provide only 40 percent of daily iron requirements, despite the mid-day meal typically providing well over half of a woman's daily energy needs (Alternativa 1992; FOVIDA 1994). Prior to the initiation of the current study, an assessment of iron status among women members of community kitchens in the Ate Vitarte district of Lima was conducted by CEPREN in March 1996. This study revealed that 27 percent of women 15-45 years of age in Lima's community kitchens were anemic, and that iron in the kitchen's rations covered only 33 percent of the women's iron requirements. It was suggested that this was due to the poor quality of meals the kitchens offer, inadequate food consumption, and certain dietary practices.

CEPREN recognized that the convergence of reduced economic support to the kitchens and a continued need for those services provided an opportunity to explore options for achieving women's nutritional benefits by improving the quality of services in the kitchens in a self-sustaining manner. To do this, CEPREN engaged community kitchen members and staff in the design and implementation of trial interventions that would stimulate both the supply of and demand for the kitchens' services.

Conceptual Framework

The project was designed to act simultaneously on two fronts (see figure 1 on page 9). The first, the *supply-side*, referred to the provision of services at the community kitchens themselves and focused on identifying institutional factors that might contribute to or impede service delivery. Factors included management practices such as bulk purchase of meal ingredients, and changes in nutritional content of meals and food preparation techniques. The second, or *demand-side*, addressed the need to increase the demand for these services among women of reproductive age (15-45 years) by increasing their understanding of the links between food consumption and health through an educational initiative.

The separation of the demand and supply sides of the project was somewhat artificial, in that the majority of the women were both clients, that is, consumers of the food prepared in the kitchens, and providers, that is, persons responsible for the preparation and serving of the meals. (It should be noted, however, that some study participants were not kitchen members. See “Study Objectives” on page 10.) This separation, however, was critical to the design and implementation of an intervention that simultaneously aimed to change both tastes and preferences for iron-rich foods among the consumers and introduce sustainable and cost-effective changes in the iron content of meals prepared in the community kitchens.

Supply-Side Component: Institutional Strengthening

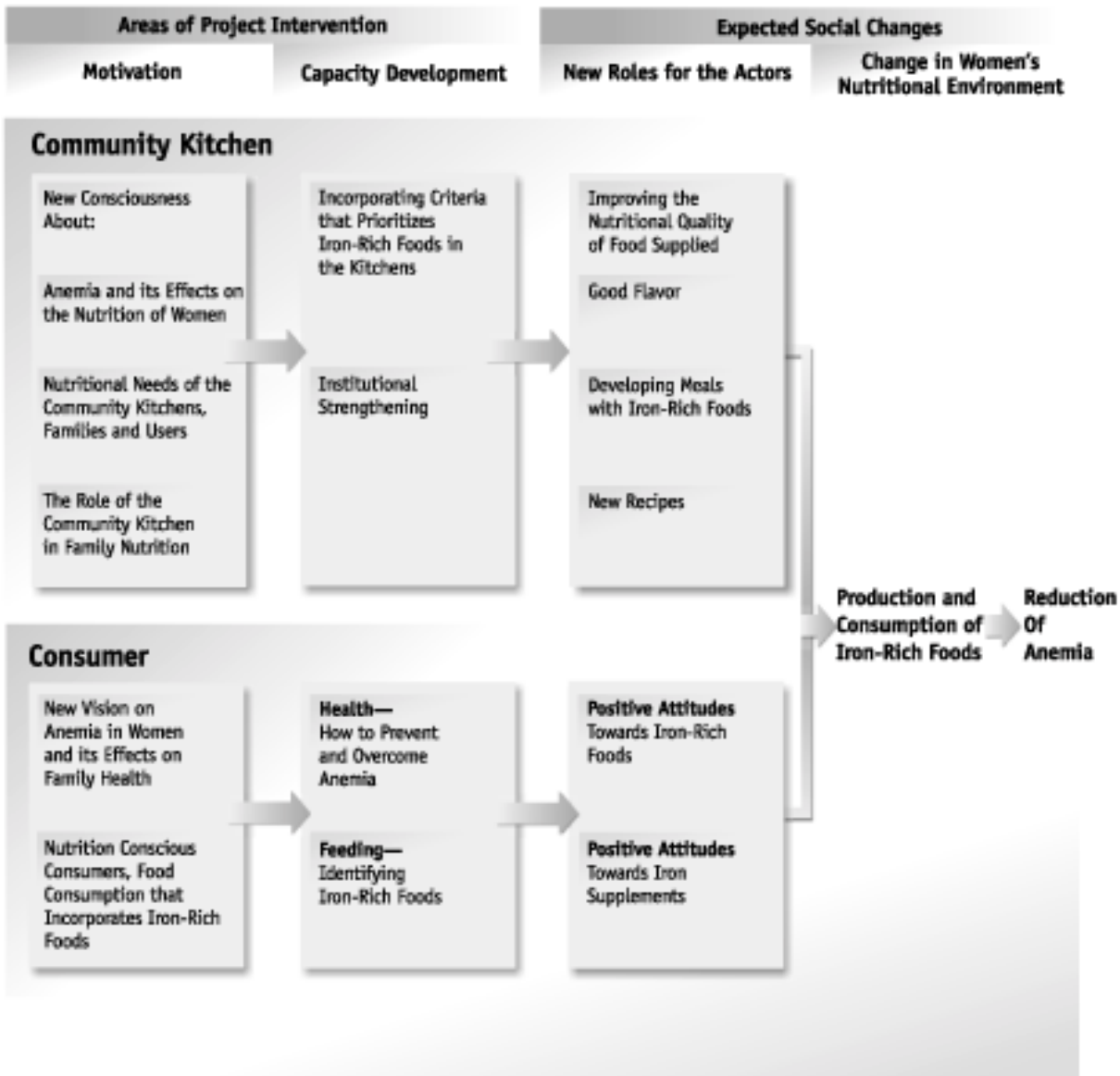
Under current economic conditions, the capacity of kitchens to meet the nutritional needs of the communities is precarious, despite subsidies from state and international food assistance programs. The meals are often of low nutritional quality and may be prepared in circumstances that are unhygienic, without adequate storage facilities or access to running water. The premise of the

project was that food preparation can be made more hygienic, food quality can be significantly improved, and the unit cost of meals can be reduced with the careful injection of small capital inputs, training, and technical assistance. This combination of supply-side interventions provided a set of feasible institutional strengthening strategies that can be easily replicated to generate consistent improvements in the administration, performance, and quality of services in the community kitchens throughout Peru.

Creating Demand through an Educational Intervention

The project also addressed the constraints that may inhibit women’s demand for the improved quality of services. In order to design this component of the intervention, it was recognized that an assessment of cultural and historical beliefs as they affect food consumption was necessary. These beliefs include the nutritional value of foods, the acceptability of mixing grains and protein-sources in the same meal, and the distribution of foods among household members. For instance, food distribution beliefs may lead women to use the meals obtained in the community kitchens to feed other family members, rather than to meet their own nutritional needs. It was hoped that exposure to new ideas about the nutritional content of foods, as well as information about the varied and changing nutritional needs of women of reproductive age, might facilitate changes in consumption patterns among low-income women in these communities.

Figure 1. Conceptual Framework



Study Objective and Design

The project, *Reducing Iron Deficiency among Users of Peri-Urban Community Kitchens*, began in 1995 with support from the International Center for Research on Women (ICRW) through the Opportunities for Micronutrient Intervention (OMNI) Research Project. The hypothesis to be tested was that a food-based nutritional intervention could reduce levels of anemia, as measured by an improvement in hemoglobin levels, of nonpregnant women participating in the community kitchens.

The objective of the intervention research study in Peru was to develop and test a nutritional intervention that could reduce anemia in women of reproductive age in a peri-urban community in Lima. It aimed to provide a feasible and cost-effective alternative to supplements as a means of increasing iron intake in populations at risk from anemia. The intervention research study used highly participatory methods to involve consumers and providers in the design, implementation, and evaluation of a cost-effective nutritional intervention, and to undertake a diagnostic of food tastes, preferences, and the nutritional quality of meals. Kitchen staff and clients were drawn into the intervention design through a number of workshops that identified the dietary and institutional constraints to improving nutrition, drew attention to the endemic nature of anemia, and involved the workshop participants in solution development.

It was expected that the study would result in new perceptions about iron-rich foods among the kitchen workers and consumers, new consumption patterns in the community kitchens, and

changes in the iron content of the meals supplied by the kitchens. These would be achieved by providing training and small capital funds to enable the kitchens to reduce the costs of meals and to improve nutritional quality, hygiene, and preparation practices. At the same time, women's understanding of the benefits of iron consumption to their health and well-being would be increased.

This intervention research study used a nonequivalent control group design to compare members and nonmembers at a group level before and after the intervention trial. Seven community kitchens were selected out of sixty in order to be representative of the volume of clients and the physical infrastructure and location of the kitchens. The sample consisted of 310 nonpregnant women of reproductive age (15-49 years old) who reported not being pregnant at the start of the study and were drawn from the population of kitchen members and nonmembers. Using 24-hour food recall, food intake data were collected from 218 of the sample members.

Community kitchen members used the kitchen services more frequently than nonmembers and formed part of the kitchen staff. Non-members used the services sufficiently to warrant their inclusion in the intervention research. Thus, nonmembers benefited principally from the supply-side intervention and less from the demand-side, as they did not participate in the workshops that were the principal means for communicating the nutrition messages.

Methodologies

Data were collected at three points in time (see table 1). First, a series of key informant interviews (October 1995) and focus groups (late 1995 to early 1996) were conducted to collect information relevant to the identification of problems, and factors that might promote or inhibit change in the kitchens. These data were used to design the interventions to be tested. To evaluate the effects of the intervention trial, data were collected one year apart (March 1996 and March 1997). This included anthropometry, food intake, serum hemoglobin, and nutritional composition and costs of the meals.

Formative Data Collection

Formative data to design the intervention trial were collected through a series of focus groups and key informant interviews. To collect supply-side data (at the level of the kitchens), five key informant interviews were conducted per kitchen—three with cooks and two with directors—for a total of 35 interviews. These interviews contributed to a composite description of kitchen services and management practices, problems limiting kitchens' delivery of services, and available resources that might contribute to improving quality of services provided in the kitchens. Finally, the interviews permitted the

collection of data relevant to identifying factors that would support or inhibit potential changes. One focus group in each of the seven kitchens also was conducted with cooks to assess the acceptability of potential changes in the menus and service delivery systems in the kitchens.

On the demand side, ten members per kitchen (total of 70 interviews) were interviewed to identify factors contributing to women's attitudes, knowledge and practices regarding consumption of foods rich in iron, use of iron supplements, and links between food consumption and anemia. One focus group was conducted with members in each of the seven kitchens on their assessment of driving and restraining forces (e.g., cultural beliefs and practices) that might impact on changes introduced in the kitchens.

Evaluation Data

Evaluation data were collected at two points in time—before (March 1996) and after (March 1997) the intervention trial. On the supply side, data included nutritional content of meals prepared in the kitchens and costs of preparing the meals. The meals included soup and an entrée with or without a beverage. Three cooked meals (per week) were randomly chosen and the

Table 1. Project implementation timeline

Phase I	September 1995	Project startup
	October – November 1995	In-depth interviews
	December 1995 – February 1996	Focus group interviews
Phase II	March 1996	Pre-intervention data collection
	April 1996 – February 1997	Intervention (one year of workshops including 4 months with nutritionally-improved meals)
Phase III	March – April 1997	Post-intervention data collection
	March – July 1997	Advocacy Activities
	December 1997	End of Project

ingredients were weighed. The average weight of the portion sizes of each meal component (soup, main course, and beverage) was used to calculate the nutrient composition of each meal. Data were analyzed using LEVANT- 1.0, a statistical program developed by CEPREN. This program is based on nutrient composition of unprepared foods and applies a conversion factor to determine the composition of cooked meals. Finally, the cost of each meal was assessed, with and without government subsidies, in order to express any cost increment or reduction as a result of implementing the intervention.

On the demand side, data included socioeconomic characteristics and anthropometry to calculate body mass index (Must et al. 1991a, 1991b). Food intake data were collected using the

24-hour recall method. Due to budgetary constraints, food intake data were collected for one day only at each point in time. It was recorded through an interview with the sample members at their homes by a member of the research team. Data were analyzed using ECOSYS Version 1.0 (Door 1990). Anemia rates were determined by percentage of nonpregnant women having hemoglobin levels less than 12 grams per deciliter. Between 2.5 and 3 ml of blood were drawn by a nurse and sent to a university biochemistry lab (Laboratorio de Bioquímica de la Universidad Peruana Cayetano Heredia) and were analyzed using the cyanmethemoglobin method (Bridges et al. 1987). Data were analyzed using SPSS/PC + 4.01 and SPSS for Windows V6.01.



Intervention

The intervention study focused on addressing the nutritional quality of meals prepared by the kitchens and kitchen management practices, as well as improving community members' understanding of the importance of the consumption of iron and developing a positive attitude toward such consumption.

Formative data collected between October 1995 and February 1996 informed the development of the trial intervention. Results indicated that cultural barriers ultimately influenced perceptions, food selection criteria, attitudes, and practices of women in regard to iron-rich food consumption and its relationship to anemia. At the same time, women expressed an interest in wanting to be engaged in the development of activities that would contribute to improving the quality of services in the kitchens as a means to improve women's iron status.

The intervention began in April 1996 and continued through February 1997. It included a series of workshops (see table 2) held with different

groups of women affiliated with the seven kitchens and the serving of nutritionally improved meals in the kitchens for four months. The workshops, organized and led by the research team, served two purposes. First, they were the mechanism for providing nutritional and health education, or the demand-side component of the intervention. Second, the workshops were the means for developing the supply-side interventions including changes in menus and management practices in the kitchens. Toward the end of the intervention trial, an advocacy activity was undertaken to stimulate interest in decision-makers to replicate and scale up the successes of this intervention research study. A description of this activity is included in the "Results" section of this report.

A critical element of the success of the intervention trial was the participatory nature of the research process. Engaging women in the identification of needs, constraints and entry points, development and implementation of interventions, and evaluating the process and

Table 2. Intervention planning and implementation through workshops

Workshop content/focus	Who participated (in each of the 7 kitchens)	Dates
"Community kitchens: taking care of women's health and nutrition"	2 delegates and 5 members per kitchen	March 24-25, 1996
"Providing quality nutritional services"	Selected management group	May 31-June 1, 1996
Women's health/nutrition; food quality; menu competition.	Members and their guests	June-August 1996
"Training food quality supervisors"	38 QA Supervisors + 14 delegates (monitors for "at risk" women)	August 12-13, 1996
"Marketing food services in community kitchens"	Presidents and supervisors	August 27-28, 1996
"Menu cost and planning"	Presidents and supervisors	September 12-13, 1996
"Community kitchens protecting families health"	Members	November and December, 1996
"Pregnancy and nursing: a decision of love and responsibility"	Nursing and pregnant women	February 4-5, 1997

outcome of these interventions led to a number of results--not the least of which was women's increased sense of decision-making capabilities. Further, by building on women's existing skills and knowledge at all levels within the kitchen organizational structure, changes were incremental rather than markedly new or different.

The first step in designing and implementing both the supply- and demand-side components of the intervention was an informational meeting with kitchen delegates and clients to work with them in developing the upcoming activities. Following that meeting, the first of the workshops explored women's perceptions and knowledge of their health and nutrition, particularly in terms of anemia, and food management including options for obtaining ingredients for preparing the meals, and preparation and serving practices. The workshop focused on how the community kitchens could take steps to prevent anemia in women of reproductive age.

A creative training methodology was used to engage participants in sharing their experiences and concerns regarding health and anemia. The theoretical concepts were supported by the use of visual aids, practical exercises, and storytelling. This method stimulated the active participation of the women by enabling them to share experiences and relate personally to the workshop topics. Summaries were constructed so that the participants could have biographical material of their activities.

Participants in the second workshop, "Providing Quality Nutritional Services," included directors from each of the seven community kitchen. The methodologies used were highly creative, participatory, and visual, and included sharing of personal experiences. Further, participants received practical training in how to analyze and select among alternative means to provide quality food services so that they could use this information to develop their own supply-side interventions in their particular kitchens.

A series of workshops addressed the supply-side issue of providing meals that met the iron and other nutritional needs of clients. Three sessions were conducted in each community kitchen for both members and clients. Women were provided with information on health and nutrition, and discussed what they considered "quality" food services. These were contrasted with the services currently provided by the kitchens. A menu competition took place as part of the workshop to develop recipes that would increase nutritional quality of the meals. Approximately 13 dishes were presented from each kitchen and they included new iron-rich dishes that could be easily prepared in the kitchens. Ninety percent of all members participated in the training.

One of the key mechanisms for assuring the quality of services in kitchens was the workshop on training "quality assurance" kitchen supervisors. Participants were presidents and delegates from each of the seven community kitchens. The workshop focused on raising participants' awareness of the need to practice quality control in preparing and serving nutritionally balanced meals, practical knowledge for organizing quality control measures, and identifying the basic functions and skills for responsible supervision. Participants analyzed illustrative situations ("critical incidents") and developed solutions to identified problems. This workshop was of critical importance for achieving long-term food quality improvements by strengthening supervisors' support and commitment to adopting change and disseminating it to other kitchen supervisors within the larger federation network.

To expand the client base and increase revenues for the kitchens, a workshop on "Marketing Food Services in Community Kitchens" was held. This workshop focused on how strengthening leadership can improve the quality of the services offered, and how sensitizing participants to the nutritional quality and presentation of foods is essential for high quality services. Representatives from each of the seven kitchens explored

ways to diversify their client base, particularly to bring in more clients who could pay the full (unsubsidized) price for the meals while still meeting the needs of clients less able to pay. The kitchens were given seed monies by CEPREN to purchase equipment and uniforms, and to institute such changes as construction of workbenches, installation of pipes, and improvement of the existing drainage systems. Although the seed monies did not exceed US\$1000 per kitchen, they were sufficient to provide an impetus for making the services and the kitchen staff more

professional, and contributed to improved working conditions, cleanliness, and the overall appearance and functioning of the kitchens.

At each workshop, educational information and discussions related to creating a demand for the consumption of the new higher quality meals were conducted. These focused on causes, prevention, and treatment of anemia, and contribution of food consumption to general health and well-being.

Results

In March 1996, 310 nonpregnant women were sampled and 189 of these were reevaluated one year later.¹ The composition of members and non-members in the sample were not significantly different in terms of age, membership in the kitchens, hemoglobin levels, and nutritional status at the two points in time. Eighty-five percent of the women were 20 to 49 years old with the remaining 15 percent being 15-19 years old. The majority (approximately 60 percent) were not members of the kitchens and slightly more women were not anemic.

Approximately three-quarters of the women had a body mass index that fell within the normal range (Must et al. 1991a and 1991b). Twenty-two percent of women at baseline and 27 percent at post-intervention were overweight (BMI above the 85th percentile of the NHANES I reference), while

only three percent of women at baseline and one percent at post-intervention were underweight (BMI < 5th percentile).

Supply-Side Results

The major meal for Peruvians is eaten at mid-day, thus, all data reported hereafter are based on this mid-day meal as prepared in the kitchens. The meal, as served in the kitchens, is composed of a soup, main course, and a drink or fruit. Prior to the intervention, tea or coffee tended to be served with the meal; whereas, after the intervention, fruit juices were provided. Soups were vegetable in base, while the main course was modified to include more low-cost heme iron (dietary iron derived from animal sources) foods, such as entrails and blood sausage. These were served with rice or other grains, roots or tubers.

Table 3. Change in nutrient composition of mid-day meals

	Calories	Protein	Iron	Vitamin C	Vitamin A
Soup	Maintained an average of 200Kcal	Maintained an average of 7g protein	Total iron: 42% increase Heme iron: 80% increase	11% increase	3.1% decrease
Main Course	6% decrease	Maintained an average of 22g of protein	Total iron: 30% increase Heme iron: 293% increase	116% increase	334% increase
Total per meal	7.9% decrease (mean: 1019kcal) (RDA: 50%)	Maintained an average of 29g of protein (mean: 29g) (RDA: 65%)	Total iron 35% increase (mean: 8.2g) (RDA: 55%) Heme iron: 225% increase (mean: 0.65mcg) Bioavailable iron: 96% increase (mean: 0.45 mg)	84% increase (mean: 36.93 mg) (RDA: 60%)	334% increase (mean: 565.17 mcg) (RDA: 113%)

¹The 39 percent loss at follow up was attributed to women's discomfort with having their blood drawn and difficulties in finding women who may have moved out of the area or were no longer coming to kitchens.

Nutritional quality of meals served at the community kitchens.

The nutritional value of the meals prepared at the community kitchens were measured pre- and post-intervention one year apart. The main changes in nutrient content are highlighted (see table 3). The meals greatly improved in terms of iron, vitamin C, and vitamin A content, particularly in the composition of the main course. Protein content remained the same while there was a slight reduction in caloric content.

There was nearly a three-fold increase in the use of recipes that were good sources of iron – from once a week to three or four times a week.

Recipes were not repeated although the same types of meat (liver and gizzards) were used in three or four different recipes during the week at three of the seven community kitchens. The frequency of nutritionally inadequate preparations -- defined as those that were imbalanced in terms of their macronutrient distribution and reduced content of animal sources of nutrients (8-15g) -- decreased by half, from twice to once a week.

Costs for preparation. Part of the institutional strengthening focused on cost recovery. Consumer purchase price for meals increased by almost 50 percent during the intervention so that the real cost of the meals would be completely covered. Meals were sold at different prices to different

consumers, with the intention of minimizing the overall margin of subsidy. Although the kitchens remained dependent on food subsidy, the margin of the subsidy was reduced because donated foods made up a smaller proportion of the meals' ingredients.

The average production cost of a meal was reduced from US\$0.49 at baseline to US\$0.46 at post-intervention (excluding labor and input subsidies). If all subsidies were removed and all inputs acquired in the market (excluding labor), the average cost of producing a meal would have been reduced from US\$0.82 to US\$0.67.

Demand-Side Results

This section reports intake data for 218 women at baseline and 166 at post-intervention. Of the 218, 94 (43 percent) were members of the community kitchens under study, whose noon-day meals came consistently from the kitchens, and 124 (57 percent) were non-members, whose noon-day meals were only occasionally obtained from the kitchens.

A summary of changes in key nutrient intakes (heme iron, proportion bioavailable iron, total iron, vitamin C, and vitamin A) is shown in table 4, and described in the intake sub-sections below. Of note is that kitchen members appeared to benefit most from this food-based intervention.

Table 4. Significant changes in nutrient intake (pre- to post-intervention)

	TOTAL	Members	Non-members	Anemic women	Non-anemic women
Total iron	—	—	—	—	—
Heme iron	↑	↑	—	↑	↑
Bioavailable iron	↑	↑	↑	↑	↑
Vitamin C	—	↑	—	↑	—
Vitamin A	↓	—	—	—	—

Note: — = no significant change

Consumption patterns. The women's consumption patterns were somewhat modified by the intervention. Although their meals still consisted mainly of foods of vegetable origin—including cereals (e.g., rice and bread), potatoes, and vegetables (e.g., carrots and onions)—and were limited in meat and citrus foods, there was an increase in the percentage of women who consumed foods rich in heme iron, and food or beverage sources of ascorbic acid. Further, a modest reduction was observed in the percentage of women consuming beverages such as coffee and tea that interfere with iron absorption. As expected, energy and protein intake did not change with the intervention.

Iron intake. Grains remained the main sources of iron in the diet (39 percent of total iron intake before the intervention and 41 percent after), followed by fruits and vegetables (from 39 to 32 percent), and meats (an increase from 12 to 16 percent). While there was a reduction in the percentage of women who consumed red meat (from 28 percent at baseline to 21 percent at post-intervention), there was an increase in the consumption of lower-cost sources of heme iron. These included poultry (56 percent before to 64 percent after), organ meats (14 to 33 percent), and fish (15 to 28 percent).

For the entire sample of women—members as well as non-members—most iron came from foods prepared at home, followed by meals prepared at the community kitchens, both at baseline and at post-intervention. The meal that provided them the most iron was the noon meal, whether prepared at home or in the community kitchens. During the intervention, however, the contribution to total iron from meals prepared at the community kitchens increased from 24 to 32 percent of their intake, while the contribution from meals prepared at home fell from 65 to 51 percent.

There were significant increases in women's intake of heme iron during the intervention (see summary of changes in table 4). For the entire sample, the median intake of heme iron increased

from 0.24 to 0.38 mg (Mann-Whitney test, $p < 0.05$). This increase occurred mostly among community kitchen members, for whom it more than doubled, from 0.19 to 0.42 mg; whereas there was little change among non-members (0.31 to 0.33 mg). Also, the increase in heme iron intake occurred in women who were both anemic at baseline (0.21 to 0.37 mg) and non-anemic (0.27 to 0.41 mg).

Similarly, the amount of bioavailable iron in the women's diets, an estimate of the proportion of absorbable iron of total iron intake (Monsen et al. 1978), increased significantly from 3.7 to 4.2 percent (Mann-Whitney test, $p < 0.01$). This increase was significant for members (3.6 to 4.2 percent) as well as non-members (3.9 to 4.2 percent), and for anemic (3.6 to 4.6 percent) as well as non-anemic women (3.7 to 4.7 percent).

Total iron intake, on the other hand, did not change significantly during the intervention (median of about 8.0 mg) because the increases in heme sources of iron seemed to replace decreases in the non-heme sources. When disaggregated by meal, however, total iron intake had increased for lunch (from 2.7 mg to 3.66 mg) and dinner (from 1.43 mg to 2.03 mg) for all women. The largest increase occurred at the lunch meal among non-anemic women (median of 2.1 mg at baseline to 3.6 at post-intervention). Consistent with the overall insignificant change in total iron intake, the intervention appeared to have no impact on increasing the percentage of the RDA for total iron met by the women (29 percent at baseline and post-intervention based on the median) (National Academy of Sciences 1989).

Vitamin C intake. Because vitamin C enhances iron absorption, intake data was analyzed for vitamin C adequacy. There was no significant change in vitamin C intake for the entire group (median of 34 mg at baseline and at post-intervention). However, there were significant increases among the community kitchen members (34 mg before and 38 mg post-intervention)

and among the anemic women (32 to 36 mg, respectively), and decreases of similar size among the non-members and non-anemic women. The decreases appeared to be due to a replacement of citrus juices by juice mixes that were enriched with vitamin C, but at lower levels than the citrus juices. Changes in the proportion of the recommended daily allowance (RDA) for vitamin C met by the women in these groups paralleled the changes in the amount of vitamin C intake. According to the median vitamin C intake, the women met only about 50 percent of the RDA.

Vitamin A intake. Recent studies indicate that good vitamin A status favors iron status, although the mechanisms are not yet well understood (Bloem et al. 1990; Suharno et al. 1993). In addition to the possible synergism, it was hoped that this intervention would increase vitamin A intake so that vitamin A status could also benefit. However, overall vitamin A intake did not increase. In fact, it decreased somewhat for the entire group (median of 468 mcg RE at baseline and 413 at post-intervention; Mann-Whitney test, $p < 0.05$), and similarly among members and non-members, and anemic and non-anemic women. No overall increase was observed because the increase in vitamin A from the consumption of meats (from 10 percent of vitamin A intake at baseline to 19 percent at post-intervention) was offset by a decrease in the beta-carotene equivalent from green and yellow vegetables (from 63 to 51 percent, respectively). The decreases in the proportion of the RDA for vitamin A met by the women were smaller than the decreases in amount of intake, with the median vitamin A intake representing about 75 percent of the RDA. In fact, there was actually a small, though not significant, increase in the proportion of the RDA met by members (based on the median, 78 percent at baseline and 83 percent at post-intervention) and by anemic women (76 to 83 percent).

Anemia. Samples of blood serum for hemoglobin were collected from 310 women at baseline of whom 51 percent (158 women) were members and 49 percent (152 women) were nonmembers. Post-intervention blood samples were drawn from

189 women, 43 percent (81) were members and 57 percent (108) were nonmembers.

The prevalence of anemia was significantly reduced from 49 percent prior to the intervention to 41 percent post-intervention ($p < 0.05$), as assessed by hemoglobin levels for nonpregnant women below 12 g/dl. Mean hemoglobin levels at baseline were 11.6 g/dl and 12.0 g/dl after the intervention trial. While there was little change in hemoglobin values among women 20 to 49 years from baseline to post-intervention (nearly half were anemic at both times), there was a drop in prevalence among adolescents 15-19 years (from 37 percent to 15 percent). This is attributed to the greater number of pregnancies and short birth intervals experienced by the older women. The highest prevalence of anemia was among the members at both measurement points, although there was a decrease in prevalence among these women from 51 percent to 43 percent. This finding is not surprising since it is thought that the most impoverished women are the most likely to be anemic and also the most likely to be community kitchen members. Finally, overweight women tended to be less anemic at both baseline (31 percent) and post-intervention (25 percent) than women with a normal BMI (53 percent at baseline and 49 percent at post-intervention) and underweight women (a decrease from 63 percent to 50 percent). Paired comparisons of baseline and post-intervention hemoglobin levels of 79 women (53 members and 26 nonmembers) reflected the above results.

Women's Roles and Contributions

This study used highly participatory methods to engage women members in deciding how to improve service delivery in the community kitchens. Women members applied their knowledge and experience to develop new menus using locally available iron-rich foods (liver and gizzards, among others). They learned how to adapt preparation and serving methods used in their homes to those more appropriate for the scale of meal preparation used in the kitchens. Women were trained as "quality assurance supervisors" to develop and maintain new standards for managing

and running the kitchens, and they benefited from both the intensive health and nutrition education messages to stimulate demand for the nutritionally-improved meals and their own daily consumption of the nutritionally-improved meals. Conversely, nonmembers “benefited” only from occasional consumption of these meals. This degree of involvement may have contributed to the differential effects of the intervention on members and nonmembers.

For instance, food intake data show that members’ consumption patterns changed from consuming more of the soup and less of the main course at baseline to consuming less of the soup and more of the main course at post-intervention. This behavioral change effectively meant that they were consuming more of that portion of the mid-day meal that had a proportionately higher nutritional value, thereby contributing to their improved nutritional status. Further, the health and nutrition education sessions influenced how women viewed “quality” of meals, from needing to “eat well with vitamins” to “eating meals with the necessary quantities of iron-rich foods.” Women members also changed their perceptions

regarding iron supplements. At baseline, women believed these supplements were to be taken only when one was sick while, at post-intervention, they recognized that taking iron supplements would help them improve their energy levels and “cure” anemia.

Finally, women members’ involvement in the intervention trial also appeared to influence their perceptions of the kitchens as a source of quality service, perhaps further motivating them to improve their food consumption patterns. At baseline, they believed that membership in the kitchens conveyed few benefits to them and that “they couldn’t get anything better.” Over the course of the project, their opinions changed such that they began to feel that the meals prepared in the kitchens in their neighborhoods were of better quality than those offered in kitchens that were not part of the intervention trial. The result was a new perception that, although the kitchens were established as a poverty assistance program, the food or the service did not have to be of poor quality; that, in fact, they could provide high quality services themselves and that they were “deserving” of this.



Advocacy Component

An advocacy activity was undertaken by CEPREN to disseminate the findings and provide information to specific groups of individuals and policymakers who might use the findings to implement similar interventions, fund additional research, and support kitchens, donors, and food programs throughout Peru. Members of other community kitchens and the central coordinating committee for community kitchens in Lima, and representatives of public sector agencies and nongovernmental organizations that support the kitchens through direct and in-kind contributions were targeted.

One hundred participants from kitchens around metropolitan Lima and the central organizing committee attended a seminar organized by CEPREN. The advocacy messages focused on demonstrating that anemia is a prevalent problem in community kitchen participants, and that community kitchens should supervise the quality of food in order to prevent anemia.

CEPREN also conducted a seminar, “Nutritional Focus and Methodologies, a Challenge for Peru: Lessons and Opportunities,” with the support of USAID, WHO, UNICEF, and FAO. Approximately 110 nutrition and other related professionals from donor agencies, NGOs, the public sector, and journalists attended. The key advocacy message for this group was: “An educational intervention focusing on the reduction of anemia in women can produce changes in their consumption patterns, and can improve their nutrition and health status at an affordable cost.” A video was produced that documented how women in the community kitchens can improve the nutritional quality of the services provided. The video showed what occurred in the kitchens which made changes, how they were made, and what these changes meant for the women. As a result of the advocacy seminars, CEPREN was contracted to provide training services to the National Program of Food Support (PRONAA) through 95 workshops on methodologies to improve the quality of nutritional services in 4200 community kitchens in metropolitan Lima.

Discussion

This intervention research study was motivated by the recognition that community kitchens continue to provide a critical service to poor families and by the increasing need to reduce costs for maintaining services provided by the community kitchens and their dependency on subsidized supports. A critical element in the design and implementation of the intervention trial was the role women played in making decisions on the development and implementation of the interventions. Participatory methods created the opportunity for women to articulate their ideas for improving service delivery, and to test and then see the results of their initiatives. While there may be some concern as to the time needed for using participatory processes and the opportunity costs to women who participate in them, results of this study demonstrate the value of using this participatory process. Thus, a one-year investment in implementing a participatory process led to a four-month food-based intervention that resulted in measurable improvements in women's nutritional status.

This study also built in an element that is often overlooked in the use of participatory methodologies, that is, ensuring that the necessary systems and support are in place to enable the implementation of decisions arrived at through the participatory process. In this case, the project provided small (less than US\$1000) seed grants to the kitchens that enabled the members to improve their infrastructure and food management capacity. Without this critical financial input, the supply-side options might have been more limited and the solutions that were developed might have been more difficult to implement. At the same time, the seed grants should be considered a reasonable start-up investment that will ultimately pay off in self-sustaining solutions.

The changes in foods used in meals may be attributed to the intervention's focus on use of heme iron foods, e.g., organ meats that were affordable and readily available. For instance, consumption of pork and beef fell, replaced by cheaper organ meats, and increased consumption of chicken and fish. The increase was small but qualitatively significant causing an important increase in iron absorption. In addition, because these substitutions were made by community women as a result of their assessment of costs and acceptability in terms of taste, it is likely that the use of these lower cost foods will be sustained in the community kitchens. Finally, because of economies of scale in meals prepared in the kitchens, women were able to improve their iron intake at less direct cost to them than if they tried to use these same food products in meals prepared at home.

The increase in heme iron despite no overall change in total iron caused an increase in the bioavailability of iron that led to the reduction in the percent of anemic women. It is important to note that this reduction occurred after only four months of changes in the meals prepared in the kitchen. Greater gains would be expected after a longer period of exposure to this supply-side component of the intervention.

Also of interest in the study was body mass index. Both baseline and post-intervention data indicated a rather high proportion of overweight women in the sample. While this is not unusual for the region (Sanchez-Grinan 1998), it is difficult to interpret given that data also demonstrated that women's mean caloric intake was quite low (1352 kcal at post-intervention or only 66 percent of the recommended allowance). Possible explanations were not assessed but might be

attributed to differences in physical activity; the bias in collecting only one day of dietary intake, thereby misrepresenting intake if averaged over several days; or the fact that overweight women may have actually reduced intake in order to lose weight or under-reported intake to give the appearance of losing weight. This merits further attention.

On the whole, the findings demonstrate that members benefited more (increases in heme iron, bio-available iron, and vitamin C intake) than did nonmembers (increase in only bio-available iron intake) from the intervention trial, as expected. Most probably this can be attributed to the fact that they were more active in the community kitchens and, therefore, had greater accessibility to the nutritionally improved meals. This result is similar to that found in a previous study which explored the nutritional benefits and effects on women's activity patterns among community kitchens in Lima (Huffman et. al. 1990). Likewise, anemic women who were members benefited in terms of improvements in heme and bioavailable iron and vitamin C. This contrasts with nonanemic women who demonstrated improvements only in heme and bio-available iron. These data suggest that community-based food interventions can, within a relatively short period of time, be effective in reducing anemia among nonpregnant women 15-45 years of age.

Limitations

The important results from this intervention research study should be interpreted within the context of the following limitations. First, the short four-month time period allocated to the implementation of the food-based intervention may have minimized its outcomes. As reported above, the study's findings indicate only a relatively small response to improving iron intake and reducing iron deficiency. However, if the intervention had been implemented over a longer period of time, more significant improvements might have been achieved.

Further, the intervention did not include a mass media component that may have provided additional means to reinforce and diffuse the nutritional messages. The use of the mass media can contribute significantly to creating greater awareness of and promoting innovative practices, in this case, consuming low-cost heme iron foods.

Logistical constraints also limited the research team's abilities to track dropouts (39 percent attrition) and control for factors that may have differentiated them from those sample members who continued to participate in the intervention trial. Although the different groups of women based on age, membership in the kitchens, nutritional status, and anemia did not appear to be significantly different at baseline and at post-intervention, the lack of follow-up on dropouts does not allow us to know how dissimilar they were.

Conclusions and Recommendations

Despite the cultural and traditional parameters that inform and confine food preparation and consumption choices, it is possible to increase the availability and consumption of iron-rich foods by women of reproductive age in the community kitchens. The key elements were:

- ▶ Using participatory methods to engage women in the design and implementation of actions that seek to change consumption attitudes and preferences;
- ▶ Providing an infusion of resources to support the implementation of those interventions;
- ▶ Addressing both supply- and demand-side issues simultaneously; and
- ▶ Stimulating adoption of new practices by increasing women's knowledge and information.

Conclusions

This study has demonstrated that, with appropriate planning and use of participatory methods, a one-year intervention including four months of changes in diet intake can result in measurable nutritional benefits. The intervention produced changes both in the menus prepared in the community kitchens and in the intake of women of childbearing age who utilize their services. The greatest improvements were observed during the mid-day meal where there was an increase in the percentage of women consuming low-cost heme iron food sources and vitamin C-enriching juice mixes. This led to a significant increase in the bioavailability of iron despite there being no change in total consumption of iron, and a consequent and equally significant reduction in the prevalence of anemia among these women.

The women in the community kitchens proved to be enormously creative in the way they incorporated different iron-rich food sources into their recipes. Involving them in all stages of the

diagnosis, implementation, and evaluation of the intervention proved to be critical in facilitating sustainable changes in food preparation and consumption practices. The institutional strengthening provided the necessary inputs to change food preparation practices while improving the quality of the food supplied and the working conditions for those women who dedicated time and effort to food production. The educational intervention reinforced new food consumption practices and reduced the barriers to incorporating diverse foods of animal origin into the diets of the kitchen consumers. Although income constraints limit the choice and consumption of foodstuffs, the intervention was able to achieve substantial improvement of iron levels through a community-based educational focus on women.

However, anemia rates remained high following the trial intervention, and food consumption data indicate that women face severe constraints in accessing foods that meet their required daily allowances for critical nutrients, including calories, protein, iron, and vitamin C. Further, women's continued use of the kitchens as a means to meet their families' and their own nutritional needs suggests that the kitchens continue to fill a critical food security need for these low-income families. Thus, programs aiming to improve nutrition of community members need to address the underlying constraints women and other community members face in ensuring household food security and nutritional well-being, and, in particular, poverty.

Finally, the institutionalization of quality control measures in the kitchens through training women as "quality assurance supervisors" appeared to increase community members' view of the acceptability of the kitchens. Rather than being seen as a service for "poor people" and, therefore, of poor quality, the physical improvements, the changes in management practices, and the

improved quality in the menus, led to a sense among the community kitchens members that the kitchens provided high quality services that were of value. Investing in women's abilities to take decisions and act upon them, and ensuring that they had the necessary inputs to support those actions, were integral to the success of this project.

Recommendations

Based on the findings of this innovative, community-based intervention research study, the following recommendations are made for program planners, policymakers and researchers.

■ **Apply a Multi-sectoral Approach:** Interventions to reduce iron deficiency should be tailored to the type and degree of iron deficiency. For women who are critically deficient in iron, use of iron supplements is appropriate. Then, beyond the critical stage, food-based interventions can provide the appropriate means to continue to recover and then maintain adequate iron status over the long term. However, because it is clear that food insecurity and other constraints women face in achieving good health and well-being are economic in nature, interventions to reduce poverty are critical to reaching those objectives. Policymakers and program practitioners should give attention to improving women's and other family members' abilities to earn income, so they can purchase the goods and services needed to improve their overall health and well-being, as well as to direct nutrition interventions. Thus, intervention designs should identify risk categories and provide activities that meet both critical, short-term needs as well as long-term needs.

■ **Use Participatory Methods to Achieve Sustainable Results:** This study demonstrates that measurable nutritional benefits are achieved when client populations are engaged in the identification of problems and solution development through the use of participatory methodologies. Decision-makers should ensure that planning and implementation of any services, programs or other interventions designed to

benefit community members must build on client input, and, to the extent possible, ensure that program planners and service providers are trained in the use of participatory methodologies. Further, in supporting this process, decision-makers must commit to providing (either directly or indirectly) the necessary inputs for implementing the outcomes of that process. Without that critical support, the participatory process may fall short of achieving its ultimate objective. Finally, service providers may need encouragement to support a process that they may feel is too lengthy and cumbersome to be efficient.

■ **Scale Up the Intervention Trial:** Given the positive indications from the study that food-based interventions can contribute to reducing anemia, particularly for community kitchen members, it is recommended that this particular trial be extended over time and expanded in scope to assess the long-range improvements in iron status as well as other nutritional benefits. Further, if these benefits can be expanded to members of other kitchens, the range of impact could be greater. Efforts should be made in this expansion to focus on creating demand for the improved services, particularly targeting non-members who may achieve similar benefits as members if they use the kitchen more often. It may also be that with an increase in client base, the kitchens could further reduce their dependency on subsidized services and become more self-sustaining. In addition, because the changes in this study were seen among women living in poverty and food insufficiency, extension of the intervention to include women living under less severe constraints would contribute to a fuller understanding of the potential range of benefits that would accrue from this type of intervention.

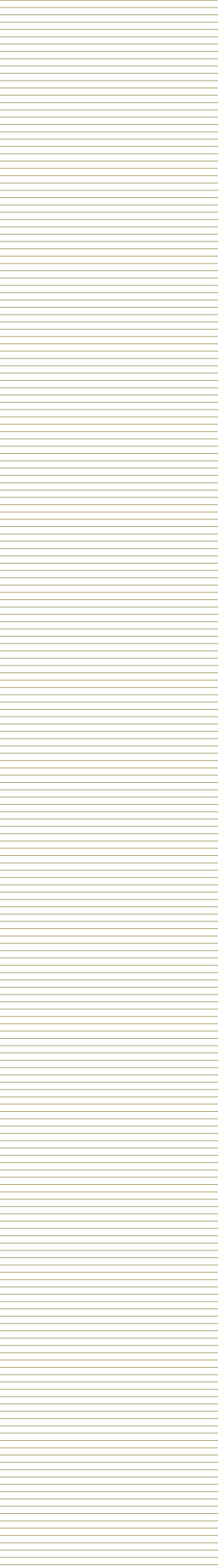
■ **Complete the Picture:** The results of this research are quite promising in terms of meeting multiple outcomes, such as improving nutritional status and increasing women's community-level decision-making roles. However, there are a number of findings that merit further investigation.

In particular, additional research using both qualitative and quantitative methods should be undertaken to identify factors that contribute to the high rates of overweight among these women. Further, and building on the third recommendation, additional research may be needed to test out ways to scale up the intervention. For instance, what activities would be directly replicable on a larger scale and might need to be modified; what inputs would be needed; and what are the costs and benefits to scaling up?

Finally, it should not be inferred that because women chose to invest their time and energies in this highly participatory process, that they would make similar investments the next time or over the long term. Thus, more research should be conducted to explore women's perceptions of the costs and benefits of participating in a time-intensive process such as was used in this study, and what they may need to offset those costs and enhance their benefits.

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