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Health in the Hands of Women: A Test of Teaching Methods

Laura C Altobelli, DrPH, MPH
José Cabrejos-Pita, MD, MPH

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The "Health in the Hands of Women" Project in Huánuco, Peru is supported by the American people through the United States Agency for International Development (USAID) through its Child Survival and Health Grants Program. "Health in the Hands of Women" Project is managed by Future Generations under Cooperative Agreement No. AID-OAA-10-00048. The views expressed in this material do not necessarily reflect the views of USAID or the United States Government.

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Women Leader teaches a mother with a flipchart. Photo: Lurdes Cabello.

Key Findings:

- **An innovative method for teaching female community health workers, "Sharing Histories," contributes to changes in key health knowledge and practice in mothers and early prevention of stunted growth.**
- **While illiterate mothers improve knowledge and practice from home-based education by specially-trained women leaders, their children remain stunted indicating need for more long term and comple-mentary intervention.**

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OPERATIONS RESEARCH EXECUTIVE SUMMARY

Health in the Hands of Women: Test of a CHW Teaching Method "Sharing Histories"

This operations research was funded by the U.S. Agency for International Development through the Child Survival and Health Grants Program from Oct. 2010 to Sept. 2014.

December, 2014

Background and Setting

The USAID CSHGP-funded Project "Health in Hands of Women" (MAM), was implemented by Future Generations (FG) in rural Peru from 2010 to 2014. The MAM project goal was to "contribute to sustainable improvements in maternal and child health in three micro-networks of primary health care in Huánuco, which can later be scaled up to the region and nationally." Project partners were the Regional Government and Regional Health Office of Huánuco; the Huánuco health service management network and three micro-networks; and four district governments. Project area had 26 primary health facilities, 180 communities, and 93,000 inhabitants with high female illiteracy and poor access to safe water, sanitation, and electricity. The project targeted change in mothers' behaviors in child care to prevent stunted growth. Strategies strengthened organization and management of primary health services linked to a system for community health worker (CHW) training and support for effective health promotion in communities, collaborating with local government.

Problem and Solution

The training of CHWs is a growing priority in global health programs with recognition of the need for closing the gap between formal health services and mothers/families in communities. There is little research or evaluation on CHW training, ranging from type of training curricula and training materials to the type of teaching methodologies that are most effective for CHW learning. CHWs with low levels of basic education from a traditional cultural background may need to learn with quite different methodologies than a more educated CHW. In this research, we have tested an innovative methodology for teaching CHW called "Sharing Histories" which focuses on female CHW who can better reach mothers to effect behavior change in maternal, neonatal, and child health practices.

Intervention

The “Sharing Histories” teaching method provide female CHW (called Women Leaders-WL) learners with the opportunity to share and examine their own personal experiences with maternity, newborn, and child health and nutrition. Learning is built on WLs recall of what they experienced, what they did or did not do, what problems they had and how they solved or did not solve them, who else helped them, how they felt about the situation, and other aspects. All WL share the stories of each of their pregnancies, births, breastfeeding and complementary feeding of each child, children’s´ health problems (i.e. diarrhea) with no immediate feedback from the Tutor (health personnel facilitator) so as to encourage all the stories to be told with no fear of judgment. After the stories told by all training participants who listen attentively to each other, comes the listing of cultural practices on the topic which is enriched by the recent telling of the histories, and each practice is discussed as to why it is a good practice, or why is it not. This is followed by review of each of the messages and images of the flipchart and practice in using the flipchart to teach mothers. Through this process, WL take ownership of their history and experiences, improve self-confidence and ability to express themselves and speak out, and become better able to share experiences and new information with other women in her neighborhood and community.

The control group of WL, on the other hand, received training based on answering questions on what they know or don´t know on factual questions regarding the workshop topic, then brainstorming and discussion of cultural practices in general on the topic. This was followed by review and practice of each of the flipchart messages, same as the intervention group.

The OR intervention was embedded within a larger package of interventions to change health behaviors of mothers, with a multi-component strategy for community health promotion for behavior change, supported by health system strengthening and leveraging of local government support to community health promotion.

Methods

This study was a cluster-randomized controlled trial, which used an experimental pre-test post-test design with groups of communities randomly assigned to intervention and control groups. Twenty-two health facilities were matched and randomized to intervention or control groups. Tutors with the Community Facilitators and Women Leaders selected from the communities in their respective health facility jurisdictions were trained in the assigned teaching methodology, either “Sharing Histories” (intervention group) or a standard participatory training method for CHW (control group). All other interventions were held constant between the two groups. Impact on mothers and child anthropometry in the community was measured by KPC household surveys at baseline, midline and endline. A complementary qualitative study was conducted of Tutors, Community Facilitators, and Women Leaders to determine their thoughts and opinions on the effect and effectiveness of the “Sharing Histories” methodology for teaching CHW.

Findings

The overall results of the project intervention provide strong statistical evidence that provision of health education to mothers significantly changes maternal knowledge and behaviors, especially for knowledge on danger signs, child feeding practices, and on indicators of women´s empowerment. This effect was found in both groups: women who received home visits and education from WL taught with “Sharing Histories”, and others who received health education from WL taught with standard CHW teaching methods. Comparing the two groups, we found that the innovative teaching intervention provided better results, but mainly for more educated mothers. In contrast, the children of illiterate mothers had high rates of stunting both at baseline (BL) and at endline (EL) in both the control and the intervention groups.

Conclusions

The exposure of mothers to visual materials such as a flipchart was associated with a lower prevalence of stunting in their children, if they were in the intervention group as compared to the control group. The level of maternal education (illiterate, any primary education, or any secondary or higher) was not associated with this finding, since the distribution of mothers´ exposure by educational level was similar in both study groups. We speculate that the better outcome in stunting in the exposed intervention group was associated with the effectiveness of that exposure. It is possible, in other words, that the Women Leaders (WL) and Community Facilitators (CF) who had been trained using the "Sharing Histories" methodology were more empowered, more self-confident, and more able to effectively convince mothers to change behaviors that would improve child growth, as compared to the control group of mothers who were also exposed, but with less effective impact. In a male-dominated society, improvement in women´s empowerment is a critical intervention to improve maternal and child health indicators.

The study shows that improvements in child growth can be gained through a well-organized educational program in the home that achieves behavior changes in mothers. The effective involvement of WL to achieve this behavior change in mothers may have been enhanced by the utilization of the culturally appropriate "Sharing Histories" methodology.

Recommendations

This study suggests that the methodology used for teaching volunteer community health workers (CHW) is an important issue to consider when developing training programs for community maternal and child health. We found that it is feasible to prevent chronic child malnutrition (stunting) through a community-based health promotion that involves female CHW trained with appropriate teaching methodology in addition to appropriate teaching and learning materials for educating and monitoring mothers and children in the home. The study confirms the need for further research on educational interventions for low-literacy mothers that will support conditions for preventing chronic malnutrition (stunting) in their children.

Use of Evidence

Use of an empowering methodology such as "Sharing Histories" can be an important strategy to teach WL and provide them with a culturally appropriate tool that allows WL to be better promoters of health messages to other women in the community. "Sharing Histories" as a teaching method helps women develop self-confidence and the agency to express themselves and to begin the process of becoming more independent decision-makers for the benefit of themselves, their families, and their children. More time and effort need to be devoted to reaching women and mothers who have the least education and are unable to read. A system focus on strengthened government services that are able to sustain careful selection, special training, and consistent supervision of Women Leaders, who are somewhat older and respected in the community, should be further implemented and evaluated as an important means to reach rural women for improvements in maternal and child health and nutrition. Impact indicators such as improvements in child growth, and not only changes in maternal knowledge and practice, should be measured to evaluate the effectiveness of community interventions for maternal, neonatal and child health.

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For more information on "Health in Hands of Women: A Test of Teaching Methods", visit: www.future.org

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Study Team

Principal Investigator: Dr. Laura C. Altobelli, DrPH, MPH, Peru Country Director, Future Generations

Co-Principal Investigator: Dr. José Cabrejos-Pita, MD, MPH, Project Manager in Huánuco, Future Generations

Project Field Team: Dennys Talenas
Vilma Suárez-Giga
María Lurdes Cabello
Natalie Garcia
Jonathan Bazán

Household survey data collection and analysis conducted by the Nutrition Research Institute, Lima Peru
Responsible Reseachers
Mary Penny
Hilary Creed-Kanashiro
Statistician
Margot Marin

I. INTRODUCTION

1.1 Global problem

Home health practices by mothers to prevent illness and promote health are key to achieving improvements in health and nutrition. The challenge is how to effectively change behaviors of mothers, particularly in populations where access to health information is poor, educational levels are low, and traditional beliefs are strong. There is now strong evidence of the effectiveness of women's groups, including Care Groups,[i] [ii] on improving neonatal and child health and mortality.[iii] [iv] [v] [vi] [vii] Community action cycle, interpersonal communication, and participatory discussion groups are some of the methods mentioned as being used within the women's groups to transmit message and impact on health behaviors and outcomes. The Community Action Cycle developed in the Bolivia Warmi Project[viii] is the method most frequently mentioned in available studies, with phases of self-diagnosis, planning together, implementation, and participatory evaluation.

The training of community health workers (CHW) is a frequent component of community health programs. CHW training is a growing priority in global health programs with the recognition of the importance of closing the gap between formal health services and mothers/families in communities. In general there is little research or evaluation on the methodological aspects of CHW training, ranging from type of training curricula and training materials to the type of teaching methodologies that are most effective for learning in CHWs. Teaching methodologies may need to vary with educational level of the learner. CHWs with low levels of basic education from a traditional cultural background may need to learn with quite different methodologies than a more educated CHW.

1.2 Specific problem

Peru is one of several South American countries that is moving to middle-income classification, but at the same time is facing a growing gap between the haves and the have nots with increasingly inequitable distribution of the fruits of development. In particular, the Huánuco Region of Peru on the eastern slope of the Andes Mountains has one of the highest rates of stunting (low height-for-age) in children under five years of age, as well as one of the highest rates of neonatal mortality in the country.

In relation to the problem of chronic child malnutrition or stunting, studies and evaluations have shown that government programs that are intended to address the problem are not as effective as they should be. One important aspect that is particularly absent in these programs is a system to reach mothers with communication strategies for behavior change in the home that effectively change health knowledge and practices that result in poor child growth. A recent effort by the Ministry of Health to provide standards for the training of CHW does not incorporate a clear role for CHWs in education of mothers and families to achieve improved home behaviors for maternal, neonatal and child health, nor do these standards provide guidance on effective training methodologies for CHW.

Similarly, the high rates of neonatal mortality are likely associated with poor implementation of home visits to newborns. National and local household surveys suggest deficiencies in home practices with exclusive breastfeeding, supplementary feeding, household hygiene, safe water and sanitation, as well as a series of factors related to early stimulation, maternal stress, and others that affect child growth. Furthermore, mothers

have low levels of knowledge on danger signs during pregnancy, postpartum, the newborn period, and for child illness, that prevent them from seeking opportune care.

1.3 Research justification

"Sharing Histories" is part of a new educational process developed by Future Generations to improve maternal, neonatal and child health (MNCH). The method was piloted in Afghanistan and in remote Himalayan valleys in India. In Afghanistan, an evaluation by Johns Hopkins University confirmed that this method was highly effective, contributing to a 46% reduction in child mortality.[ix] [x] The nomenclature "Pregnancy Histories Methodology" was previously used to refer to the method. We now use the name "Sharing Histories" to better reflect an integrated approach to female CHW training that includes the sharing of pregnancy, birth, postpartum, and newborn experiences, as well as experiences with care and feeding of children and of events leading to their sickness and death.

The idea for "Sharing Histories" was germinated in Afghanistan by a Future Generations team led by Carl E. Taylor, ex-Professor Emeritus of International Health at The Johns Hopkins University School of Public Health and Senior Advisor to Future Generations. No data was available to determine infant mortality rates or identify key health problems in children and mothers, so as part of the training of the selected local women, each participant was asked to recount their own experiences with pregnancy and childbirth. Through this process it was found that the participants were fascinated to hear other women´s experiences, and became enthused to learn more about each of the situations that were commonly faced and how to resolve them. What was found was that the women were becoming empowered to ask questions and learn more.

As a result of this field experience by Dr. Taylor, Future Generations Afghanistan Country Director at the time, he developed an hypothesis and in 2005 to 2006, collaborated with the Ministry of Health of Afghanistan to implement operations research asking the question, "How can we train community health workers in a culturally appropriate and cost-effective way to improve the care of mothers and children in the home, in the most isolated communities?" This project had the objective of empowering women through use of a participatory teaching methodology based on their recounting of their own experiences. Women were selected from each community and were trained in various health topics using this teaching methodology. The women would then be responsible for teaching mothers in their homes. It was demonstrated that when pregnancy histories were shared by selected women volunteers at All-Women Workshops, these women appear to be significantly empowered to go back and replicate the learning in their own communities, to convince other women to take charge of their own health care and that of their families and communities, including using more effectively available health services. The pregnancy histories bring out for discussion practices, beliefs, problems, and successful health action, both traditional and modern. In remote villages women responded most eagerly to a chance for self-reliant empowerment and quickly changed behavior.

After the training, the funding ran out, but the trained women decided to continue the work on their own, demonstrating a sustainability that had not been seen before in other health programs. Compared to other programs that emphasized infrastructure projects, this project strengthened the capacities of women in the community. A household survey evaluation conducted by the Johns Hopkins University in 1000 households showed a reduction in mortality of children under age five in 46% over a period of two years. The Afghanistan MOH scaled up the home-based training strategy to 13 provinces. In three years Afghanistan achieved the major success of increasing MOH health coverage by 77 % in 13 provinces (Taylor, 2003).

Given the particular characteristics of Afghanistan, Future Generations International felt it was necessary to adapt and test the methodology in other cultural settings, and developed projects in Peru and India. In Peru, the objective was to adapt and test a new methodology for training CHW called "Sharing Histories" that could be scaled-up for use by the Peruvian health sector and then globally. For this purpose, FG Peru successfully obtained a small grant from the Maternal Health Task Force of EngenderHealth (through a subgrant from the Bill & Melinda Gates Foundation) that allowed adaptation and initial testing of the methodology in a cluster-randomized controlled trial with 28 indigenous highland communities in rural Cusco. Fourteen communities were in each group, considering intervention and control groups. A total of 75 women leaders were trained in seven topics. Half of them were trained using the Sharing Histories methodology, and the other half were trained on the same topics with a standard teaching method. Women leaders were then followed to measure their level of activity in teaching other mothers in their respective communities. Changes in maternal knowledge and practices in the two groups of communities were also measured by household surveys at baseline and endline. Due to the small sample size, this study was considered a pilot effort, leaving the need to reproduce the study on a larger scale in the context of other health sector interventions.

Rural women and those with low educational attainment generally have special needs for effective learning. Through sharing their own experiences and hearing those of other women, they become quickly attuned to the topic at hand, and their curiosity is piqued to hear from the facilitator what practical solutions could have used in a concrete circumstance so that when the situation repeats, they have knowledge of viable options for preventing and solving problems. The telling of personal histories of pregnancies, birthings, and child rearing creates bonding as women learn from each other, and contributes to stronger social networks which have been shown to be critical for improving self-esteem and the empowerment to take action in new ways. Traditional beliefs and practices are discussed in the context of more scientifically grounded explanations.

As a new educational approach for women's groups in developing countries, the "Sharing Histories" method falls under the category of "testimonial learning," which is referred to in the literature as a highly effective form of health education.[xi] Future Generations has adapted the process piloted in Afghanistan and India for use in a third country, Peru, and in this study has evaluated the effectiveness of this educational approach through operations research using a cluster-randomized controlled trial. We have also done qualitative research on the empowerment process in the intervention group using "Sharing Histories" to better understand the dynamics of women´s empowerment using this method.

1.4 Brief description of type of study and research design

This study used an experimental pre-test post-test design with health facility jurisdictions that were randomly assigned to intervention and control groups, also called a cluster-randomized controlled trial. Twenty-two health facility jurisdictions, with an average of 4000 rural inhabitants each, were matched and randomly assigned as either intervention or control. Community health workers (CHW) were trained in their respective health facility in the training methodology assigned to that health facility.

1.5 Objectives / Hypotheses

The objective is to test the effectiveness of a teaching method for women leaders (female community health workers) comparing an innovative method called, "Sharing Histories", with a standard participatory teaching method.

The hypothesis is that mothers of children under age two years in the intervention group will be more likely to change health behaviors and their children will have better growth, as compared to mothers who receive health promotion interventions from women leaders trained in the control group methodology.

II. STUDY DESIGN AND METHODS

2.1 Design

The study design used is an experimental pre-test post-test design. Health facilities along with their respective jurisdictions of communities were randomly assigned to intervention and control groups, also called a cluster-randomized controlled trial. Twenty-two health facilities were matched and randomized to intervention or control groups. According to their health facility designation as intervention or control, health personnel trainers (Tutors) were trained in the assigned teaching methodology, either "Sharing Histories" (intervention group) or a standard participatory training method for CHW (control group). Tutors were then responsible for training the Community Facilitators and Women Leaders selected from the communities in their respective health facility jurisdictions. All other interventions were held constant between the two groups. Impact on mothers in the community was measured by KPC household surveys at baseline, midline and endline. A complementary qualitative study was conducted of Tutors, Community Facilitators, and Women Leaders to determine their thoughts and opinions on the effect and effectiveness of the "Sharing Histories" methodology for teaching CHW, for the purpose of better understanding the OR findings.

2.2 Study participants and method of selection

The study participants are Tutors, Community Facilitators (CF), and Women Leaders (WL) who are female community health workers selected and trained within the project area of the Future Generations-implemented project, "Health in the Hands of Women". A total of 22 health facilities were the selection units that were randomized to either the intervention or control groups. Randomization of the health facilities was done by first setting up matched pairs of health facilities on the basis of size or complexity of the health facility and distance from the district capital. For each matched pair, random assignment to either study group was made based on the flip of a coin.

CF and WL were considered to be included in either study group by virtue of the health facility in which they received training. All communities and mothers/families in the jurisdiction of a particular health facility were considered as part of the intervention group or control group in accord with the assignment of their closest health facility. Health personnel participating as Tutors and Sectorists in the overall project, "Health in Hands of Women", were unaware of the existence of a comparative study. Tutors were trained in two separate groups, either with the intervention group teaching methodology, or with the control group teaching methodology. Since Tutors were unaware of the two different teaching methodologies being used by the Future Generations project, they were unlikely to compare notes with friends who might be working in health facilities of the alternate study group. These procedures served to avoid contamination between the two study groups.

2.3 Ethics/informed consent

Informed consent was obtained by all mothers who were interviewed in household KPC surveys at baseline (BL), midterm (MT), and endline (EL), with child anthropometry also measured. The KPC household studies were conducted by the Institute for Nutrition Research (IIN), a reliable research organization in Lima, Peru contracted by Future Generations for this purpose. Approval of the household surveys was obtained from the Institutional Research Board (IRB) of the IIN for the study protocol for interviewing mothers.

2.4 Study duration/dates

The study took place from October 1, 2010 to September 30, 2014. Training for Tutors lasted one day for each training module topic. Training for WL and FC lasted an average of two days on each topic. Several topics required more training time. One training workshop per month was provided for WL and FC in each health

facility, therefore training was spread out over the entire project duration starting in August 2010 and continuing to the end of the project 2014. When the first cycle of six training topics was completed, another round of training was initiated repeating the sequence of topics. The third round had started in May, 2014 under the responsibility of Tutors when MAM project staff ended their participation in order to help with end-of-project evaluations and closure activities.

Table 1: Comparison of Intervention and Control Group Variables

Variable	Intervention Group	Control Group
Training of Tutors on adult education methods (not including "Sharing Histories")	Yes	Yes
Training of Tutors on use of facilitator manuals that use the "Intervention Teaching Methodology- Sharing Histories"	Yes	No
Training of Tutors on use of facilitator manuals that use the "Control Teaching Methodology- Standard CHW Training"	No	Yes
Initial monthly training of WL and FC in use of flipcharts for teaching mothers	Yes	Yes
Refresher training of WL and FC	Yes	Yes
Monthly supervision of WL by FC	Yes	Yes
WL and FC provided with a complete set of flipcharts for teaching mothers	Yes	Yes
WL and FC trained with a participatory methodology	Yes	Yes
WL and FC trained using "Sharing Histories" throughout the training process	Yes	No

2.5 Intervention description and independent variables

The intervention was implemented in the context of a program strategy for behavior change of mothers through a system of home visits by trained Women Leaders as community health workers. This was implemented within a larger project strategy for strengthening the health system as well as local collaborative management between primary health care services, local government, and communities to support community-oriented health promotion. For the strategy to improve health promotion focused on mothers, newborn, and children, we developed a "*Modular Program for Training in Maternal, Neonatal, and Infant Health for Women Leaders.*" The program introduced innovations in four areas: training and education materials for health behavior change, human resources for community health, formats and checklists for home monitoring, supervision, and community reporting, and teaching methodology.

Materials introduced in the project were a series of flipcharts and accompanying facilitator manuals for each flipchart. The modular series of materials covered the following topics: pregnancy, birth & postpartum, newborns, breastfeeding, infant growth and nutrition, diarrhea and hygiene, and pneumonia.

Two sets of facilitator manuals were produced for the study. One set that was used to train Intervention Group Tutors incorporated the innovative teaching methodology, "Sharing Histories". The other set of facilitator manuals was used to train Control Group Tutors, which was based on a standard participatory training method for CHW. Both sets of facilitator manuals sought to train the same content, based on the same set of flipcharts. Tutors were responsible for training using the methodology presented in their Facilitator Manuals.

The project introduced and developed four types of human resources for health. These were: Tutors for Promotion of Maternal, Neonatal and Infant Health (health personnel), Sectorists (health personnel), Community Facilitators (CF) (community health workers paid a stipend by local government), and Women Leaders (WL) (female volunteer community health workers). The role of Tutors was to serve as trainers of Community Facilitators and Women Leaders, teaching them how to educate mothers in the home using the

flipchart series on main topics. Tutors were trained in how to utilize the series of "Facilitator Manuals" that accompany the flipcharts, one for each topic. CF were a new cadre of human resources whose role it was to support WL. Each CF was responsible for about 20 WL, and met with them in smaller groups of 6-7 WL each once or twice a month to review the training from that month´s workshop in the health facility with the Tutor, and to practice using the flipchart to teach mothers. If a WL had missed the workshop that month, the CF either taught her during these small group sessions, or the CF visited her at home to provide the training on the missed topic. CF were also charged with accompanying their WL on home visits until the WL felt comfortable doing the visits by herself. The third role of the CF was to convene WL each month to the health facility and make sure the WL attended. Finally, the fourth role of the CF was to attend the workshops herself to receive training from the Tutor. Each of these roles was a product on which the CF had to report in order to receive her full monthly stipend from the municipality. WL had several roles including to attending the monthly workshop, developing a map of her community to identify homes with the risk groups of pregnant women or children under age 2, and visiting these "high risk" homes on a monthly basis. During the home visits, the WL was to teach the mother key knowledge and behaviors, monitor whether the mother was practicing these behaviors, monitor the mother and/or child for danger signs, and refer to the health facility for periodic preventive care visits (prenatal, well child, immunizations) or to obtain care if illness or danger signs were detected in the mother, newborn, or child.

The independent variables for this study therefore included exposure to home visits by Women Leaders, understanding of flipchart messages, knowledge and behavior changes in key practices for maternal, neonatal and child health, and women´s empowerment:

(a) Implementation of home visits to mothers by Women Leaders to inform and promote new key behaviors for MNCH. This was measured most accurately in the final evaluation KPC survey.
(b) Understanding by mothers of key messages provided by Women Leaders using flip charts. This was measured in the final evaluation KPC survey.
(c) Behavior changes and knowledge of danger sign by mothers on a set of key indicators on health services utilization, breastfeeding and child feeding, hygiene and sanitation behaviors, and early home treatment of infant illness. Measured at baseline, midterm and endline in KPC household interview surveys of mothers with children 0-23 months of age in a cluster-random sample of 606 households in each survey. Intervention and control communities were sampled independently with 303 households in each area.
(d) Empowerment mothers was measured by a series of empowerment-related questions were asked of mothers in the baseline, mid-term, and endline surveys.
(e) Empowerment of CF and ML was assessed in an endline qualitative study with key informant interviews with Tutors, CF and WL from the intervention group was conducted to determine their perceptions and opinions on the use of "Sharing Histories" as a part of the teaching methodology. This study was done for the purpose of providing explanatory background on results of the quantitative study. Interviews were also conducted with control group Tutors, CF and WL for contrasting information. Interviews were tape-recorded, then transcribed into Word documents. Analysis was done by a trained medical anthropologist using the Atlas Ti software package. Information from all the interviews were triangulated in the analysis. Table 2 shows the types and numbers of key informants interviewed for this qualitative study.

Table 2: Types and numbers of key informants for the qualitative assessment of "Sharing Histories"

Key Informants	Number of Interviews			
	Women Leaders	Community Facilitators	Tutors	Total
Intervention communities	6	6	6	18
Control communities	2	2	2	6
Total	8	8	8	24

2.6 Procedure (How the intervention was implemented)

The intervention was focused on the type of specific teaching methodology used. MAM Project personnel worked with Tutors in each health facility for the first two rounds of training (monthly workshops from the first through mid-fourth project year), to ensure that the Sharing History methodology was being used as per the Facilitator Manual on each topic.

The Facilitator Manuals for the intervention group had the following special characteristics. Each training module topic began with an introductory session of an ice breaker exercise with a verbal pretest. The second session involved the recounting or sharing of histories by each Women Leader of each of her children on the topic at hand, starting with her oldest child. Usually there were two facilitators (Tutors) present. One Tutor facilitated the sharing of histories, using a list of questions to stimulate the recounting of the personal experience of each WL on the topic at hand, asking her to go into more detail when necessary. The second Tutor or helper was taking notes on the histories of each WL, filling out the Format for Histories on that topic that is found at the end of each Facilitator Manual. No feedback or comments were made by the facilitators while WL told their histories to ensure that WL would express themselves without fear of judgment. This session was implemented only with the intervention group.

For the control group, the Facilitator Manuals were based on standard participatory method for CHW training. Each training module topic began with an introductory session of an ice breaker exercise with a verbal pretest. The second session was a participatory dialogue in which the facilitator used a brief list of questions to determine what the WL trainees knew or did not know about the topic. The focus was on what knowledge the WL had, and not on what experience the WL had had.

The second session for each training module topic was to identify cultural habits and practices, listing them on poster paper, followed by a discussion of which practices. For the intervention group, the listing was very long and rich since many issues had been brought up during the sharing of histories. For the control group, WL were asked to brainstorm on cultural habits and practices on the topic. In both study groups, the list of cultural habit, beliefs and practices were listed on poster paper. Each point was then discussed in group, with the facilitator identifying how and why each practice or belief listed was a good one for improved health, or was bad for health. Good practices were marked in green; neutral practices were marked in blue; and bad practices were marked in red.

For each session thereafter for the training module topic, the intervention group started off answering even more in-depth questions posed in the Facilitator Manual on their experiences with the particular topic of that session in relation to the flipchart page being discussed. In the control group, each session started with questions on their knowledge of the topic covered on the flipchart page, not referring to their own personal experiences.

The intervention methodology was implemented in way that blinded all project partners and participants to the existence of an operations research study embedded within the "Health in the Hands of Women" Project. Tutors were not informed that the teaching method they were using was different from another method used in other health facilities. Nor were project partners in the Regional MOH Office nor in the Health Network Management Centers or Micronetworks informed as to the existence of a differentiated teaching methodology.

2.7.1 Dependent variables and measurement

Prevalence of stunting in children 0-23 months of age. Anthropometry measured at baseline, midterm and endline during KPC household interview surveys of mothers with children 0-23 months of age in a cluster-random sample of 606 households.

The three KPC surveys were contracted out to the Nutrition Research Institute (*Instituto de Investigación Nutricional-IIN*), which developed the sampling frame, trained and supervised interviewers, managed data entry and analysis, and prepared the KPC Endline Report. Intervention and control communities were sampled independently with 303 households in each of the two areas. The IIN was provided with a list of Group A and B health facilities to develop the sample, then the communities were combined when given to the survey teams.

This was a blinded study, since the survey teams were unaware that a comparative study was being undertaken. Likewise, the Regional MOH Office in Huánuco and all other project partners were unaware of the existence of a comparative operations research study on "Sharing Histories" throughout the project.

2.8 Intervention monitoring techniques

(a) Adaptation and distribution of training and education materials.
(b) Attendance of Women Leaders and Community Facilitators was registered at each training workshop and recorded by project staff on a master training attendance matrix.
(c) Pretests and posttests on WL and CF on each training module. The same test was given at both points in time. Pretests and posttests were standardized and were included as an annex in the Facilitator Manual for photocopying. Questions were asked verbally with open ended responses that were noted. A question was graded as correct if the WL or CF had mentioned the minimum number of correct responses to each question.
(d) A midterm self-administered questionnaire was filled out by all Tutors to obtain their opinion on the training methodology they were using, based on a Likert scale.
(e) Baseline, midterm, and endline household surveys determined changes in knowledge, practices and coverage of key indicators as compared with baseline.
(f) The endline household survey also determined exposure of mothers to home visits by Women Leaders and understanding of a sample of flipchart images and their respective learning messages.

III. FINDINGS

3.1 Intervention monitoring results

3.1.1 Training and education materials production (adaptation) and distribution

Materials for training community health workers (Women Leaders and Community Facilitators) and for educating mothers centered on the series of previously developed Future Generations flipcharts. These were adapted to the Huánuco region with new artwork where needed to show local clothing, hair, and hat styles, then reprinted and distributed to project partners as shown on the table. Pneumonia was not an original project topic but was added due to demand from Women Leaders and health personnel in selected project areas.

Table 3: Types and distribution of teaching and education materials

Module Topic	**Type of Material Provided**			
	Flipchart to educate mothers	Enlarged flipchart images to teach WL and FC	Facilitator Manual for Control Group Tutors	Facilitator Manual for Intervention Group Tutors
Module I: Empowerment, Equity, and Leadership in the Community (Introductory Facilitator Manual)			1 copy of each Module I-VII for each Tutor in 11 Control HF*	1 copy of each Module I-VII for each Tutor in 11 Intervention HF
Module II: Pregnancy Module III: Birth & Postpartum Module IV: Newborn Module V: Breastfeeding Module VI: Diarrhea Module VII: Infant Growth	1 set for each of 700 Women Leader and 66 Community Facilitators. Several sets for each of 26 HF	1 set for each flipchart for each of 26 HF		
Module VIII: Pneumonia	1 copy for each WL, CF, Tutor, and 10 HF	1 set for each of 10 HF	1 copy for each Tutor in 5 Control HF	1 copy for each Tutor in 5 Intervention HF

*HF=health facility

3.1.2 Attendance and test scores of Women Leaders at training workshops

According to workshop attendance sheets, 100% of women leaders selected by their communities attended the first workshop on the topic “Pregnancy” in the health facility, with training provided by health personnel trained as “Tutors”. After that, the attendance by WL in the intervention group varied but remained above 80% for all workshops except the final one. Community Facilitators (CF) provided refresher training to WL in small groups in communities (as in the Care Group method) once or twice a month following each health facility workshop. Most WL who did not attend a particular workshop received this small group training from the CF, who also made home visits to WL who missed a workshop to provide personalized training on the missed topic; the numbers of WL who received this personalized training were not registered.

Table 4: Attendance of Women Leaders at training workshops by topic

Training Workshop Topic	Control Group (A)		Intervention Group (B)	
	N°	%	N°	%
Pregnancy	271	100%	235	100%
Birth & Postpartum	222	82%	200	85%
Newborn	239	88%	229	97%
Breastfeeding	236	87%	198	84%
Diarrhea	226	83%	193	82%
Infant Growth	199	73%	149	63%

Verbally-administered tests with 10 questions were given to Women Leaders at the beginning and end of each training workshop. Tests were administered by Tutors with support from MAM project staff. Scores are presented on a scale of 0 to 100 on Table 5. Both control and intervention groups had significant increases in learning from pre to post tests, with no differences in the average scores between the two groups on the pretest nor on the posttest. Looking at individual tests, the intervention group did better on three modules (Birth & Postpartum, Newborn, and Breastfeeding), while the control group did better on one module (Infant Growth).

Table 5: Pretest and Posttest Scores of Women Leaders for each training workshop

Training Workshop Topic	Pretest				Posttest			
	Control group		Intervention group		Control group		Intervention group	
	# WL	Score	# WL	Score	# WL	Score	# WL	Score
Pregnancy	185	45	120	40	271	80	235	80
Birth & Postpartum	133	35	108	35	222	80	200	85
Newborn	161	45	132	45	239	80	229	85
Breastfeeding	157	40	120	40	236	80	192	85
Diarrhea	162	65	146	70	226	95	193	95
Infant Growth	104	30	51	25	199	90	149	80
Average score (0-100)		44.5		45.5		84.0		85.0

3.1.3 Tutor opinions on Training Methodology

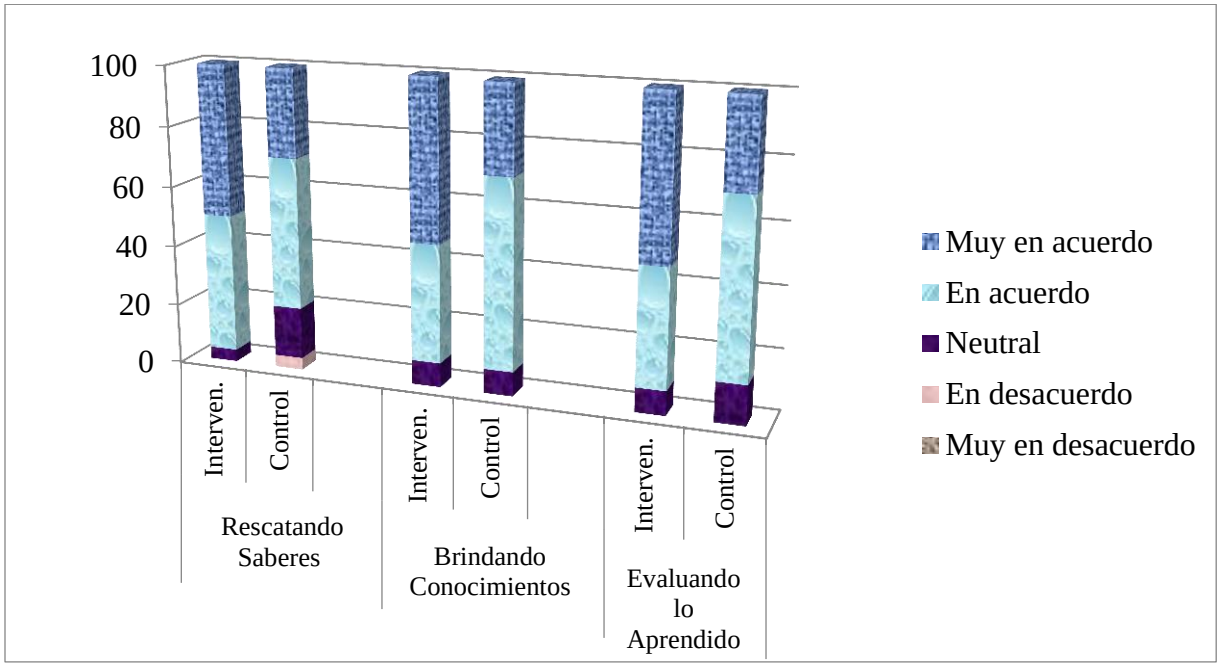
Half-way through the project, we applied a five-point likert-scale questionnaire to 52 health personnel who had been trained as Tutors responsible for the training of Women Leaders and Community Facilitators. All tutors had received training in adult education methodology, but in addition, half of them (26) who were from the Intervention Group health facilities, had been trained in the “Sharing Histories” methodology and were using the version of Facilitator Manuals that incorporated the “Sharing Histories” methodology in the lessons plans.

Tutors were asked to state their level of agreement that the method used was effective: 1-very disagreed (muy en desacuerdo), 2-disagreed (en desacuerdo), 3-neutral, 4-agreed (en acuerdo), 5-very agreed (muy en acuerdo). Each of three phases of teaching each lesson was evaluated. “Rescatando Saberes” (Identifying Knowledge) was the first phase of each session that was most differentiated between the study groups. The intervention group, Women Leaders were asked to share their personal experiences of each of their pregnancies, births, or child health or nutrition issue. No feedback or comments were made on any of the histories at that time. Control group methodology was to ask Women Leaders specific questions to state what knowledge they had of the subject. “Brindando Conocimientos” (Giving Knowledge) was the second teaching/learning phase that involved, in the case of “Sharing Histories”, the listing of cultural knowledge and

practices, followed by discussion of each and identification as a good/correct/helpful practice or as a harmful/incorrect practice. For the control group, this phase consisted of a similar listing and discussion of cultural knowledge and practices, but based on brainstorming. The third phase, "Evaluando lo Aprendido" (Evaluating the Learning), was exactly the same in both groups, and was invariably a dynamic participatory session using balloons, balls, string, music, or other devices to play a game while answering questions to evaluate learning.

The graph shows that all Tutors were in agreement that the teaching methodology they were using was effective for the learning of Women Leaders. The intervention group Tutors were nearly twice as likely to be "very agreed" that the teaching methodology they were using was effective for all three phases of the teaching/learning process for each teaching session as compared to control group Tutors.

Graph 1: Opinion of 52 Tutors on Effectiveness of Dynamics to Train Women Leaders, by study group



3.2 Relevant demographic characteristics and comparability of groups

3.2.1 Age of Child

The distribution of study children by age was not significantly different between the two study groups, neither in the BL nor at the EL survey, indicating comparability of study groups on this variable.

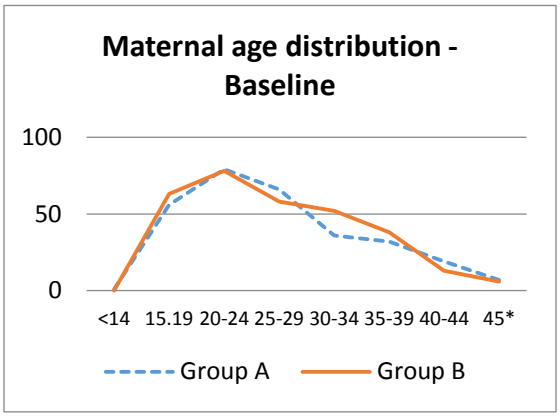
Table 6: Distribution of study children by age group

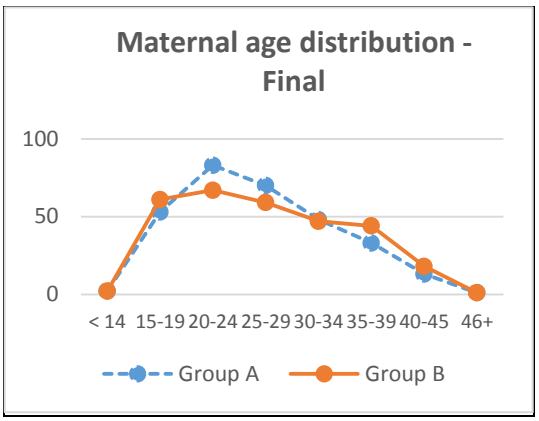
	Baseline		Endline	
	Control	Interven	Control	Interven
	%	%	%	%
0-5 months	26.5%	23.1%	24.2%	28.1%
6-11 months	24.2%	28.6%	29.8%	26.8%
12-17 months	30.5%	24.7%	23.2%	21.4%
18-23 months	18.8%	23.7%	22.8%	23.7%
Total	100%	100%	100%	100%
N	298	308	302	299

3.2.2 Maternal age

The baseline survey had a similar distribution of subject mothers by age group. In the Endline survey, the distribution of maternal age is slightly different between to two study groups. The intervention group (B) has more subjects who were over age 35 as compared to the control group (A) which has a greater concentration of subjects between 20 and 34 years of age. However, the difference in distribution is not significant.

Graph 2: Distribution of study mothers by age, by study group





3.2.3 Maternal education

Level of maternal education was categorized into three groups based on the reported highest grade level completed and the ability of the mother to read a sentence provided by the interviewer at the time of the household survey. Mothers who had no primary school education, and those with any primary education but who could not read the sentence provided, were categorized as “Illiterate”. Those with any primary education and could read or partially read the sentence, were categorized as having “Any primary education”. The remaining mothers with any secondary school, technical or university education were in that final category. There were no significant differences in level of maternal education between the intervention and control groups either at the BL or EL, indicating comparability of the study groups. However, there were differences in the distribution at BL compared with MT and EL. At BL, about 31% of both study groups were illiterate, and 22-25% of both groups had secondary or higher education. This relationship was the inverse at the final survey, with 22-24% of mothers illiterate, and 32-35% of mothers with any secondary education or higher in both study groups.

Table 7: Distribution of Maternal Education by Study Group

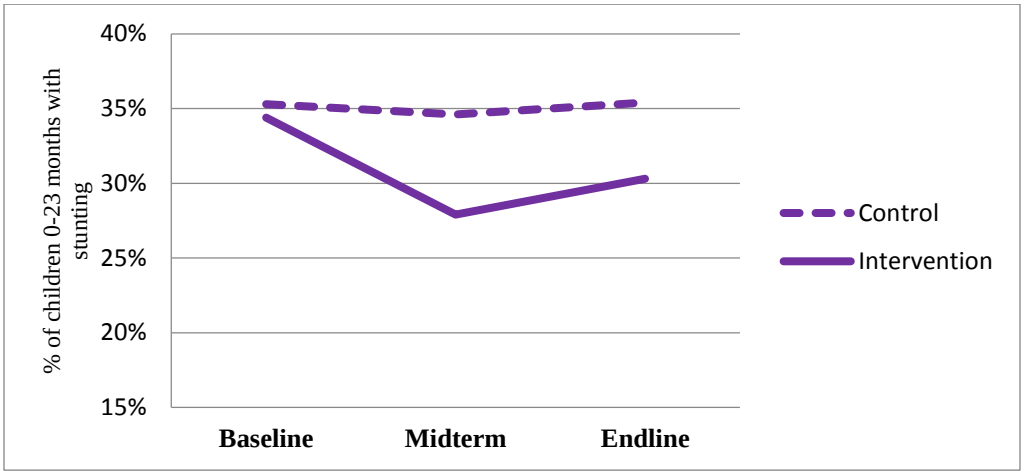
	Baseline		Midterm		Endline	
	Control	Interven	Control	Interven	Control	Interven
	%	%	%	%	%	%
Illiterate (cannot read)	31.6	30.5	24.4	26.0	22.4	24.4
Any primary education (can read)	43.2	47.2	48.1	42.8	45.9	40.8
Any secondary education or higher	25.2	22.3	27.6	31.2	31.7	34.8
Total	100%	100%	100%	100%	100%	100%
N	294	305	312	208	303	299

3.3 Major study outcomes

3.3.1. Project impact on chronic child malnutrition

Child growth is the result of multiple influences during the first 1000 days after conception, including fetal growth and many aspects of maternal care, breastfeeding practices, timing, quantity and quality of complementary feeding, morbidity, opportune access to health services, safe water, sanitation, clean home environment, and others. For this reason chronic child malnutrition (height-for-age less than -2 s.d.), or stunting, was the main outcome variable for the project which attempted to improve some of these determinants.

Graph 3: Prevalence of stunting (height-for-age <-2 Z) in children 0-23 months of age, by study group



As shown in Graph 3 and Table 8, stunting at BL was about 35% in both control and intervention groups. Stunting in the control group remained the same across all surveys. On the other hand, the intervention group reduced significantly at MT then increased at EL (BL 34.4% - MT 27.9% - EL 30.3%). At EL there was still a 5.2% difference in stunting between the two study groups.

To understand the underlying dynamics of the growth rates for study children 0-23 months of age, we looked at stunting by age of child and by maternal education.

Maternal education was strongly correlated inversely with stunting. Children of illiterate mothers had stunting in the 40-49 percent range. When mothers had primary school and could read, their children had rates in the 30 percent range. The lowest rates of stunting were found in children of mothers with secondary education or higher. See Graph 4.

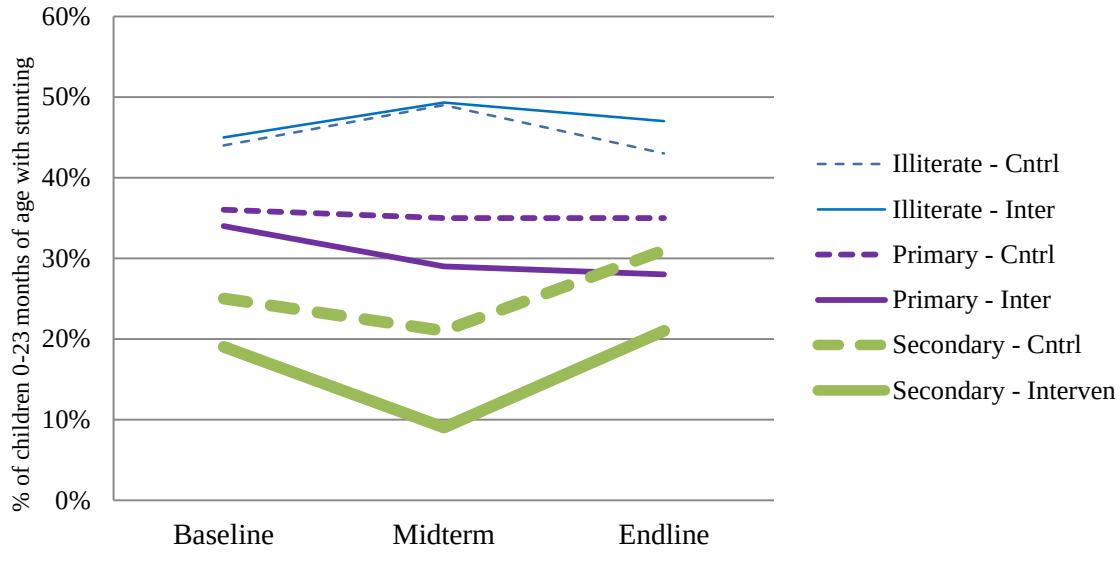
At baseline, rates of stunting were similar for both control and intervention groups by maternal education and age of child. At MT, stunting was prevented in the intervention group for mothers with primary education and even more so for those with secondary education. At EL, the prevention of stunting in the intervention group continued for mothers with primary and secondary education.

Table 8: Chronic child malnutrition (height-for-age less than -2 sd) by study group across surveys, for all study children, by maternal education, and by age of child

Percentage of children with stunting	Baseline		Midterm		Endline	
	Control %, n, CI	Interven %, n, CI	Control %, n, CI	Interven %, n, CI	Control %, n, CI	Interven %, n, CI
% of children 0-23 months of age with chronic malnutrition (height-for-age less than -2 sd)						
All study children	35.3% 104/295 29.8, 40.7	34.4% 105/305 29.1, 39.8	34.6% 104/301 29.2, 40.0	27.9%* 56/201 21.7, 34.1	35.4% 104/294 29.9,40.8	30.3% 88/290 25.1,35.6
% of children 0-23 months of age with chronic malnutrition, by educational level of mother						
Illiterate (cannot read)	43.6% 41/94	45.3% 43/95	49.3% 35/71	49.0% 25/51	42.9% 27/63	47.2% 34/72
Any primary education (can read)	36.3% 45/124	33.6% 47/140	35.2% 51/145	29.1% 25/86	35.3% 48/136	28.0%* 33/118
Any secondary education or higher	24.7% 18/73	19.4% 13/67	21.2% 18/85	9.4%* 6/64	30.5% 29/95	21.0%* 21/100
% of children 0-23 months of age with chronic malnutrition, by age group of child						
0-5 months	20.5% 16/78	21.4% 15/70	24.4% 19/78	13.3%* 8/60	19.4% 14/72	18.3% 15/82
6-11 months	25.0% 18/72	24.1% 21/87	25.7% 18/70	15.3%* 9/59	29.9% 26/87	20.0%* 15/75
12-17 months	40.7% 37/91	45.3% 34/75	36.9% 31/84	50.0% 20/40	42.0% 29/69	35.8%* 53/136
18-23 months	61.1% 33/54	47.9%* 35/73	52.2% 36/69	45.2% 19/42	53.0% 35/66	51.5% 34/66

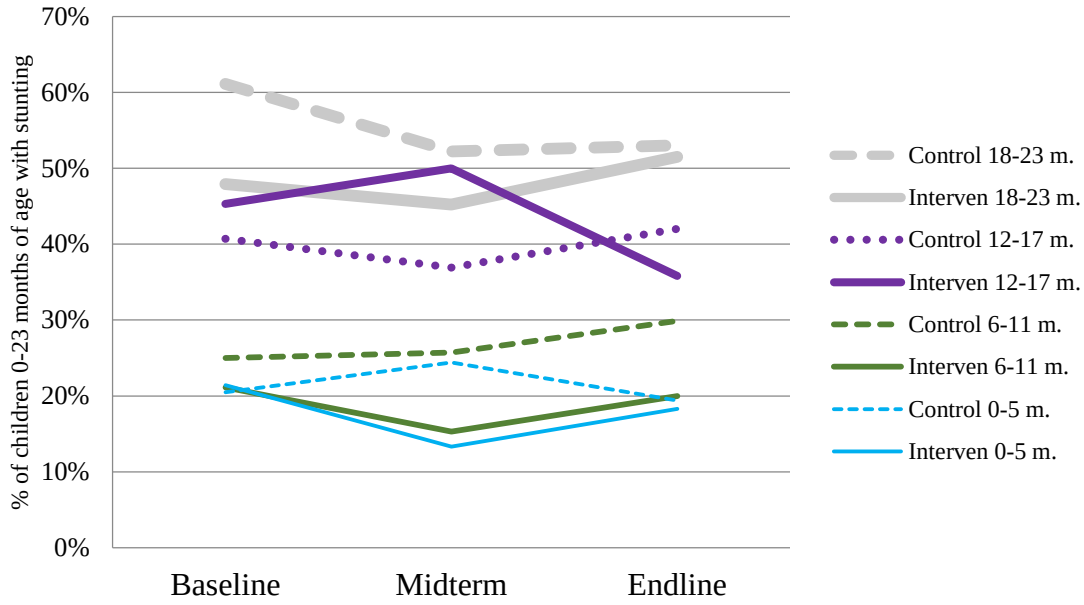
*Difference between Groups A and B at p<.10

Graph 4: Prevalence of stunting (Height for Age < -2 Z) by maternal education and study group



Assessing stunting by child age, we found a strong gradient of stunting from 0 to 23 months of age in both study groups across the three surveys. Stunting by age ranged from a low of 20-21% for children 0 to 5 months of age to a high of 45-60% for children 18-23 months of age. Rates of stunting were evenly distributed by age at BL in both study groups. However, at MT, stunting was found to decline in intervention children 0 to 12 months of age while stunting in the control group increased. At EL, intervention children from 6 to 17 months of age had less stunting than control group children of the same age groups, though the differences did not reach statistical significance. By EL, the youngest (0-5 months) control group children had some reduction in stunting. See Graph 5.

Graph 5: Prevalence of stunting (height-for-age <-2 Z) by age of child in months and study group



3.3.2 Maternal exposure to selected messages on health behaviors

In the endline survey women were asked if they had received a visit from the WL of the community during pregnancy and if the mothers had been shown drawings with health messages during these home visits. Similar questions were asked regarding WL visits to the mother in the period after the birth of the baby. Slightly more than half of mothers recalled a visit during pregnancy, and less than half received an ML visit after birth of the baby. These data should consider that about 40% of interviewed mothers with children 0-23 months of age were pregnant during the second project year when WL were recently trained and learning to visit mothers in the home. See Table 9.

Three hundred and twenty-six (54.2%) mothers had received at least one visit and most of these had received more, the average was 3.22 visits. Comparing the study groups, there was only a slight difference in number of ML visits: average 3.16 visits in the control group and 3.28 in the intervention group. See Table 10.

Table 9: Mothers´ exposure to project messages from materials with drawings

Mothers´ receipt of visits and exposure to project materials with drawings	Control Group		Intervention Group	
	%	N°	%	N°
% of mothers who reported receiving a *home visit during their last pregnancy* from a WL or CF	56.4%	171/303	51.8%	155/299
% of mothers who were taught with drawings during those *home visits during their last pregnancy*	87.1%	149/171	84.5%	131/155
% of mothers who reported receiving a *home visit to their newborn* from a WL or CF	45.5%	138/303	46.2%	138/299
% of mothers who were taught with drawings during those *home visits to their newborn*	89.1%	123/138	87.9%	121/138

+Survey interviewers showed mothers three flipchart drawings and for each was asked questions about the drawing.

Table 10: Number of visits received by mothers from a WL during pregnancy

Endline	Control Group		Intervention Group	
N° of Women Leader visits	**N**	**%**	**N**	**%**
None	132	43,6	144	48,2
1	32	18,7	32	20,6
2	42	24,6	34	21,9
3	43	25,1	37	23,9
4	22	12,9	23	14,8
5	8	4,7	8	5,2
6	10	5,8	6	3,9
7	2	1,2	0	,0
8	5	2,9	5	3,2
9	3	1,8	2	1,3
10	2	1,2	3	1,9
11	0	,0	1	,6
12	0	,0	2	1,3
Unknown	2	1,2	2	1,3
Average # visits	**3.16**		**3.28**	
# mothers visited	171		155	
Total surveyed	303		297	

Table 11: Mothers´ exposure to drawings at home either during or after pregnancy, by maternal education

Mothers´ exposure to project materials with drawings	Control Group		Intervention Group	
	%	N°	%	N°
% of **all** mothers who recalled being shown project drawings either during or after pregnancy at home	57.1%	173/303	53.5%	160/299
Stratified by level of maternal education				
Illiterate (cannot read)	50.0%	34/68	50.7%	37/73
….Any primary education (can read)	64.0%	89/139	59.0%	72/122
… Any secondary or more education	52.1%	50/96	49.0%	51/104

While a similar proportion of mothers in both study groups were exposed to project materials in home visits either during pregnancy or after birth of her child, control group mothers with primary education were more likely to report seeing the materials, as shown in Table 11.

As shown in Table 12, the prevalence of stunting was significantly lower in the intervention group who were exposed to project drawings, as compared to stunting in the control group of exposed mothers.

Table 12: Association between child stunting and mothers´ exposure to drawings at home either during or after pregnancy

% of children 0-23 months with stunting by exposure	Control Group		Intervention Group	
	%	N°	%	N°
% stunting in mothers exposed to project drawings	36.9%	62/169	26.6%*	42/158
% stunting in mothers not exposed to project drawings	63.1%	107/169	73.4%	116/158

*p<.05

3.3.3 Maternal understanding of selected messages on health behaviors

In order to assess the mothers' exposure to and comprehension of the project materials, survey interviewers showed the mothers pictures from the project flip charts and asked a series of questions. The first picture shown to mothers during the EL survey interview was from the flipchart on Breastfeeding, of a mother drinking liquids, such as traditional herbal teas, as an alternative to giving these remedies to the baby who has colic. The second was a picture from the flipchart on Infant Growth, which had the main message to feed the child with love and caring, and a sub-message that the father participate in child feeding. The third showed the father giving liquid from a cup in a spoon to his child with diarrhea, with a drawing from the flipchart on Diarrhea. See drawings below that were shown to mothers during the endline KPC survey. See results on Table 13 on the next page.

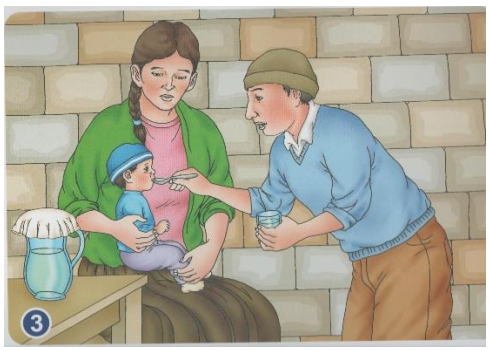
Drawing #1

Source: FG flipchart – Breastfeeding

Drawing #2

Source: FG flipchart – Infant Growth

Drawing #3



Source: FG flipchart – Diarrhea

Table 13: Mothers´ understanding of project messages

Mothers exposure to and understanding of flipchart messages+	Control Group		Intervention Group	
	%	N°	%	N°
Drawing #1: Mother drinks from a cup while baby breastfeeds				
% of mothers who recalled seeing the drawing	66.7%	202/303	64.9%	194/299
Question: What is the mother drinking?				
Waters or infusion so as not to give it to the baby	69.3%	210	71,6%	214
Waters or infusion without further comment	22.8%	69	21,4%	64
Mention of any other liquid	7.9%	24	7,0%	21
Should mothers give “waters” to babies when they have colic?				
Yes: Incorrect	33.0%	100	26.1%	78
No: Correct	67.0%	203	73.9%	221
Total		303		299
Drawing #2: Mother and father feed a baby together				
% of mothers who recalled seeing the drawing	68.6%	208/303	65.2%	195/299
Question: What draws your attention in this picture?				
The father is participating/helping	52.5%	159	61.9%	185
They are feeding the baby with patience and caring	40.3%	122	30.8%	92
The food preparation is thick	2.3%	7	2.7%	8
Other	5.0%	15	4.7%	14
Total		303		299
Drawing #3: Father spoon-feeds a child sitting on mother´s lap				
% of mothers who recalled seeing the drawing	56.1%	170/303	53.2%	159/299
Question: The child has diarrhea - what is the father giving the child in this picture?				
Home-made oral rehydration solution	17.5%	53	15.1%	45
Oral Rehydration Solution	1.0%	3	2.0%	6
Water / infusion	56.8%	172	63.5%	190
Medicines	24.8%	75	19.4%	58
Total		170		159

+Survey interviewers showed mothers three flipchart drawings and for each was asked questions about the drawing.

3.3.4 Changes in maternal knowledge of danger signs

Flipcharts used for teaching WL and CF and for educating mothers in the home and during clinic visits had a strong emphasis on key danger signs of which mothers should be aware in order to seek opportune care from a health care provider.

We asked mothers in the KPC surveys what were the danger signs in a mother that would require her to seek medical care, referring in separate questions to signs and symptoms during pregnancy, childbirth, postpartum, and in the newborn. The following table shows a significant increase from BL to EL in the proportion of mothers who spontaneously mention two or more danger signs for each period of childbearing. The increase in knowledge was especially significant for the topics of pregnancy and newborns. There were no differences found in learning danger signs between the control and intervention groups. See Table 14.

It is possible that health personnel were less motivated to teach WL and CF the danger signs in childbirth and postpartum with the fear that this knowledge would encourage home deliveries, which are strongly proscribed by the MOH and which bring drastic recriminations to health personnel on whose watch a home delivery occurs.

Table 14: Maternal knowledge of danger signs (spontaneous responses)

Percentage of mothers providing two or more correct answers	Baseline		Midterm		Endline	
	Control	Interven	Control	Interven	Control	Interven
	%, n, CI	%, n, CI	%, n, CI	%, n, CI	%, n, CI	%, n, CI
% of mothers who identify two or more danger signs during pregnancy	42.6% 127/298 37.0,48.2	39.3% 121/308 33.8,44.7	51.0% 159/312 45.5, 51.6	51.9% 108/208 45.1, 58.7	75.2% 228/303 70.4,80.1	72.9% 218/299 67.9,77.9
% of mothers who identify two or more danger signs during birth	41.6% 124/298 36.0,47.2	45.1% 139/308 39.6,50.7	43.6% 136/312 38.1, 49.1	39.9% 83/208 33.3, 46.6	56.1% 170/303 50.5,61.7	55.2% 165/299 49.5,60.8
% of mothers who identify two or more danger signs during postpartum	23.2% 69/298 18.4,27.9	20.5% 63/308 15.9,24.9	30.8% 96/312 25.7, 35.9	29.8% 62/208 23.6, 36.0	38.0% 115/303 32.5,43.4	37.8% 113/299 32.3,43.3
% of mothers who identify two or more danger signs in newborns	18.8% 56/298 14.4,23.2	23.7% 73/308 19.9,29.5	27.2% 85/312 22.3,32.2	32.7% 68/208 26.3,39.1	72.9% 221/303 67.9,77.9	65.2% 195/299 68.9,78.9

3.3.5 Maternal feeding practices - Exclusive Breastfeeding

The proportion of infants under 6 months receiving exclusive breast feeding (EBF) in project communities was high at BL and significantly increased at EL. For infants between 0 and 3.9 months, the EBF prevalence was nearly 94%. These rates are high and considerably higher than the national average for exclusive breastfeeding, using the criteria of feeding during the previous 24 hours. See Table 15.

In the control group, the rate of exclusive breastfeeding did not change significantly across the three surveys. n the other hand, the intervention group significantly increased EBF from BL to MT but then declined slightly by EL.

Table 15: Children 0-5 months of age receiving exclusive breastfeeding during in the last 24 hours

Percentage of children who received only breast milk	Baseline		Midterm		Endline	
	Control	Interven	Control	Interven	Control	Interven
	%, n, CI	%, n, CI	%, n, CI	%, n, CI	%, n, CI	%, n, CI
Exclusive breastfeeding	83.5% 66/79 75.36,91.7	71.8% 51/71 61.37,82.3	82.4% 70/85 74.3, 90.5	95.3%* 61/64 90.11, 100	92.1% 70/76 86.0,98.2	87.1% 74/85 79.9,94.2

*Significant difference at p<.05.

3.3.6 Maternal feeding practices –Frequency of Feeding

Minimum meal frequency is defined as the proportion of breastfed and non-breastfed children 6–23 months of age who receive solid, semi-solid, or soft foods (but also including milk feeds for non-breastfed children) the minimum number of times or more, calculated using the following formula with two fractions:

$$\frac{\text{Breastfed children 6–23 months of age who received solid, semi-solid or soft foods the minimum number of times or more during the previous day}}{\text{Breastfed children 6–23 months of age}}$$

and

$$\frac{\text{Non-breastfed children 6–23 months of age who received solid, semi-solid or soft foods or milk feeds the minimum number of times or more during the previous day}}{\text{Non-breastfed children 6–23 months of age}}$$

Minimum meal frequency is defined as:

- 2 times for breastfed infants 6–8 months
- 3 times for breastfed children 9–23 months
- 4 times for non-breastfed children 6–23 months including number of milk drinks

"Meals" include both meals and snacks (other than trivial amounts), and frequency is based on caregiver report.

Overall, children consumed food a mean of 3 times during the previous day, less with the youngest age group and more with the oldest at BL and MT, and this increased to 4 times a day at EL. The minimum acceptable number of times for infants 9-11 months of age is 3, so the mean frequency of 2.18 for infants 6–11 months at BL is low; this increased to 3.5 times at EL, meeting the recommended feeding frequency of appropriate complementary foods. (Data shown in KPC Endline Report)

Table 16: Percentage of children 6 – 23 months with the minimum frequency of feeding, according to their age

Children meeting minimum meal frequency yesterday	Baseline		Midterm		Endline	
	N	%	N	%	N	%
6 – 23 m	314/456	68,9	258/371	69,5	406/441	92,1
6 – 11.9 m	92/160	57,5	76/133	57,1	140/166	84,3
12 – 17.9 m	127/167	76,0	83/124	66,9	138/142	97,2
18 – 23.9 m	95/129	73,6	99/114	86,8	128/133	96,2

At BL, over two-thirds of the children 6-23 months of age consumed meals or snacks of appropriate consistency the minimum number of times during the previous day at BL: the other one-third did not reach this minimum criterion. From BL to EL there was a highly significant increase in the *minimum frequency of feeding* for children 6-23 months of age, greatly exceeding the project target of 82%. The Intervention Group B performed better than the Control Group A, but this did not reach statistical significance, as shown in Table 16.

It should be noted that the minimum number of feeding times per day is less than the recommended average number of times for consuming foods.

3.3.7 Maternal feeding practices – Minimum Dietary Diversity

Table 17 shows the proportion of children 6 – 23 months consuming the different food groups. Notably there was an increase in the proportion of children consuming orange of yellow (pre vitamin A rich) vegetables, organ meats and dairy products at EL compared with BL and MT, and a slight increase in chicken meat. It is notable that eggs are a principal animal food source and red meats are apparently not readily available. Supplementary food from government food programs was consumed by one-fourth of the study population at BL and MT, but this was reduced to 4% at EL due to program discontinuation.

Table 17: Children 6–23 months receiving different food groups based on 24 hour recall

	Baseline		**Midterm**		**Endline**	
	N	**%**	**N**	**%**	**N**	**%**
N	456		371		441	
Percentage of children who received the following food groups:						
aa Cereals, grains	363	79,6	299	80,6	361	81,9
bb Products made with iron fortified flour	342	75,0	272	73,3	342	77,6
cc Tubers and roots	400	87,7	319	86,0	387	87,8
dd Carrots, pumpkin, squash, yellow or orange sweet potato, (pre Vit A)	211	46,3	153	41,2	267	60,5
ee Beans, pulses, broad beans, legumes, nuts	172	37,7	149	40,2	180	40,8
ff Green leafy vegetables (pre Vit A)	13	2,9	7	1,9	3	0,7
gg mango, papaya, etc. (pre Vit A)	40	8,8	3	0,8	6	1,4
hh Other fruits and vegetables	238	52,2	218	58,8	322	73,0
ii Organ meat, blood	33	7,2	29	7,8	75	17,0
jj Red meat, beef, guinea pig, pork etc	38	8,3	33	8,9	34	7,7
kk Poultry meat, chicken etc.	87	19,1	66	17,8	105	23,8
ll Fish, marine and river products	18	3,9	24	6,5	30	6,8
mm Eggs	188	41,2	170	45,8	212	48,1
nn Dairy products and food made with milk	108	23,7	89	24,0	178	40,4
oo Chocolates, caramels, cake etc.	30	6,6	41	11,1	141	32,0
pp Other (mainly infant food supplements distributed from health facilities)	97	21,3	93	25,1	16	3,6

Minimum dietary diversity is defined as: Proportion of children 6–23 months of age who receive foods from 4 or more food groups:

$$\frac{\text{Children 6–23 months of age who received foods from } \geq \underline{\text{4 of the following 7 food groups during the previous day}}}{\text{Children 6–23 months of age}}$$

Table 18: Groups of the food groups used for the construction of the dietary diversity indicator.

Food groups for dietary diversity assessment	**Food groups in the survey instrument**
grains, roots and tubers	aa,bb,cc
legumes and nuts	ee
dairy products (milk, yogurt, cheese)	nn,E,F,G,H,I
flesh foods (meat, fish, poultry and liver/organ meats)	ii,jj,kk,ll
eggs	mm
vitamin-A rich fruits and vegetables	dd, ff, gg
other fruits and vegetables	hh

Table 19 shows the percentage of children 6 – 23 months meeting the indicator of *minimum dietary diversity*. It can be seen that there was a tendency to increase during the duration of the project, with a higher proportion at EL than at BL or MT, indicating a more diverse diet. A marked increase in the youngest age group, 6 – 11 months is particularly encouraging.

Table 19: Percentage of children meeting the minimum dietary diversity by age group, breastfed and non breastfed children

Percentage of children with the minimum dietary diversity	**Baseline**		**Midterm**		**Endline**	
	N	**%**	**N**	**%**	**N**	**%**
6 – 23 months	261/456	57,2	233/371	62,8	339/441	76,9
6 – 11.9 months	58/160	36,3	59/133	44,4	105/166	63,3
12 – 17.9 months	119/167	71,3	84/124	67,7	124/142	87,3
18 – 23.9 months	84/129	65,1	90/114	78,9	110/133	82,7
N	456		371		441	

Minimum dietary diversity was a project indicator with a target of 71%. This was exceeded by the project. The increase in minimum dietary diversity from BL to EL was a highly statistically significant increase.

3.3.8 Maternal feeding practices - Minimum Acceptable Diet

A minimum acceptable diet is defined as the **p**roportion of children 6–23 months of age who receive a minimum acceptable diet (apart from breast milk). This composite indicator is calculated from the following two fractions:

Breastfed children 6–23 months of age who had at least the minimum dietary diversity and the minimum meal frequency during the previous day
Breastfed children 6–23 months of age

and

Non-breastfed children 6–23 months of age who received at least 2 milk feedings and had at least the minimum dietary diversity not including milk feeds and the minimum meal frequency during the previous day
Non-breastfed children 6–23 months of age

For non breastfed children, milk is excluded from these 4 groups for the dietary diversity score indicator. The following Table 20 shows the percentage of children receiving a minimum acceptable diet (WHO, UNICEF, USAID indicator, 2008). At baseline and midterm only around half (54.4%) of the children reached the criterion of the indicator minimum acceptable diet but the prevalence was considerably higher at endline in all age groups, including the children under 1 year.

Table 20: Percentage of children 6–23 months of age with minimum acceptable diet, breastfed and non breastfed, by age group

Percentage of children with minimal acceptable diet	Baseline		Midterm		Endline	
	N	%	N	%	N	%
6 – 23 months	248/456	54,4	207/371	55,8	374/441	84,8
6 – 11.9 months	68/160	42,5	60/133	45,1	124/166	74,7
12 – 17.9 months	110/167	65,9	68/124	54,8	136/142	95,8
18 – 23.9 months	70/129	54,3	79/114	69,3	114/133	85,7
N	456		371		441	

The increase in children with a *minimum acceptable diet* from BL to EL was a highly statistically significant increase that exceeded the target of 68% by a wide margin. There was no significant difference between the study groups, as shown in Table 21.

Table 21: Summary of feeding practices for infants and young children aged 6-23 months according to World Health Organization definitions, from baseline to endline by study group

Percentage of children according to a minimum of appropriate feeding practices by age	Baseline		Midterm		Endline	
	Control	Interven	Control	Interven	Control	Interven
	%, n, CI	%, n, CI	%, n, CI	%, n, CI	%, n, CI	%, n, CI
Minimum frequency of feeding	68.0% 149/219 61.9,74.2	69.6% 165/237 63.8,75.5	69.6% 158/227 63.6, 75.6	69.4% 100/144 61,9, 76.9	89.9% 204/227 85.9,93.8	94.4% 202/214 91.3,97.5
Minimum dietary diversity	58.4% 128/219 51.9,65.0	56.1% 133/237 49.8,62.4	63.4% 144/227 57.1, 69.7	61.8% 89/144 53.9, 69.7	75.3% 171/227 69.7,80.9	78.5% 168/214 73.0,84.0
Minimum acceptable diet	55.3% 121/219 48.66,61.8	53.6% 127/237 47.2,59.94	55.1% 125/227 48.6, 61.6	56.9% 82/144 48.8, 65.0	83.3% 189/227 78.4,88.1	86.4% 185/214 81.9,91.0

3.3.9 Women´s Empowerment

i. Decision-making for health care access

In the KPC surveys, mothers were asked whether they would consider certain issues to be a big problem, or a barrier, to obtaining health care if they needed it. Table 22 shows that mothers in both study groups had a significant improvement in perceived ability to make decisions to obtain health services between BL and EL. The intervention group reported a generally greater reduction in perceived barriers to health care access as compared to the control group between BL and EL on the items of needing to ask permission to seek health care, finding transportation, and not wanting to go along to seek care.

Table 22: Changing self-perceptions of independence in making health care-seeking decisions

	Baseline			Final		
	Control	**Interven**	**Total**	**Control**	**Interven**	**Total**
	%, n	%, n	%, n, CI	%, n	%, n	%, n, CI
Percentage of mothers who, when they have a health problem, consider it a BIG problem:						
To know where to go to seek health care	32.2% 96/298	28.6% 88/308	30.4% 184/606 26.8,34.2	12.9% 39/303	11.4% 34/299	12.1%* 73/602 9.7,15.1
To ask for permission to seek health care	25.8% 77/298	29.2% 90/308	27.6% 167/606 24.1,31.3	16.5% 50/303	11.7% 35/299	14.1%* 85/602 11.5,17.2
To obtain money to seek health care	64.8% 193/298	63.0% 194/308	63.9% 387/606 59.9,67.7	58.7% 178/303	57.2% 171/299	58.0% 349/602 53.9,61.9
Distance of health services	51.7% 154/298	60.1% 185/308	55.9% 339/606 51.9,59.9	37.3% 113/303	38.5% 115/299	37.9%* 228/602 34.0,41.9
To find transportation to seek health care	60.7% 181/298	65.9% 203/308	63.4% 384/606 59.4,67.2	44.2% 134/303	38.8% 116/299	41.5%* 250/602 37.6,45.6
Not wanting to go alone to seek health care	25.2% 75/298	27.6% 85/308	26.4% 160/606 23.0,30.1	18.8% 57/303	14.0% 42/299	16.4%* 99/602 13.6,19.7
Worrying that maybe there will not be a female health care provider	28.5% 85/298	34.7% 107/308	31.7% 192/606 28.0,35.6	22.1% 67/303	22.7% 68/299	22.4%* 135/602 19.2,26.0

*p<.01

ii. Changes in various facets of women's´ agency

The following series of questions were developed and validated by Future Generations and are being tested in a series of studies and surveys around the world to further test them in different settings as measures of women´s empowerment.

Do you always have to ask permission to go and visit another community? This question is one of agency for the mother to make decisions on her own movements. In the control group, there was an increase in the percentage of mothers at all educational levels who needed to ask for permission. The opposite was found in the intervention group, where fewer mothers had to ask permission at EL as compared to BL.

This was especially notable among illiterate mothers of the intervention group, as compared to their educational peers in the control group at endline. See Table 23.

Table 23: Percentage of mothers who need to ask permission to go and visit another community

	Baseline		Endline	
	Control	**Intervention**	**Control**	**Intervention**
	%	**%**	**%**	**%**
All mothers	44.9	45.6	47.9	43.4
Stratified by maternal education				
No education - illiterate	57.7	49	61.8	46.6
Any primary education	47.2	44	48.9	43.4
Any secondary education or more	28.4	44.1	36.5	37.5
N	294	305	303	299

If you had a daughter who was seriously ill, would you have to ask for permission to take her to the health post? This question is one of agency for the mother to make decisions on her child´s health care. Both study groups improved on this question from BL to EL, but there seems to have been a greater improvement in the intervention group within among illiterate mothers of the intervention group. See Table 24.

Table 24: Percentage of mothers who would need to ask for permission to take a seriously ill daughter to the health post

	Baseline		Endline	
	Control	**Intervention**	**Control**	**Intervention**
	%	**%**	**%**	**%**
All mothers	26.5	30.2	18.2	15.4
Stratified by maternal education				
No education – illiterate	36.8	37.5	26.5	21.9
Any primary education	24.8	29.1	18	15.6
Any secondary education or more	16.2	22.1	12.5	10.6
N	294	305	303	299

Would you like to contribute more than you do now to the improvement of your community? A large majority of women say they would like to contribute more to their community, suggesting their generalized willingness to do so, but that they may have not yet found a way to do so. Illiterate mothers in the intervention group were more likely to want to contribute to their community than their peers in the control group. See Table 25.

Table 25: Percentage of mothers who would like to contribute more than she does now to the improvement of her community

	Baseline		Endline	
	Control	**Intervention**	**Control**	**Intervention**
	%	**%**	**%**	**%**
All mothers	90.5	88.5	89.1	91
Stratified by maternal education				
No education – illiterate	88.4	84.4	75	83.6
Any primary education	88.8	91.5	92.1	92.6
Any secondary education or more	95.9	88.2	94.8	94.2
N	294	305	303	299

Do you feel satisfied with the contribution you make to your community? The survey included a second question about community involvement that was slightly different and was phrased in a positive way. Both study groups, especially the better educated mothers, felt less satisfied at EL with their contribution to the community. Perhaps this reflects more self-awareness, which is a good sign. See Table 26.

Table 26: Percentage of mothers who feel satisfied with the contribution she makes to her community

	Baseline		Endline	
	Control	**Intervention**	**Control**	**Intervention**
	%	**%**	**%**	**%**
All mothers	73.5	68.5	61.7	62.5
Stratified by maternal education				
No education – illiterate	74.7	66.7	61.8	63
Any primary education	69.9	67.4	60.4	61.5
Any secondary education or more	78.4	72.1	63.5	63.5
N	294	305	303	299

Do you know women in your community who influence others and who motivate practices and beliefs that are advantageous? In all surveys women about half of women recognize that there are women in the community who are influential and motivating in a positive way and know them. This seemed to increase in all educational groups from BL to EL in both study groups. See Table 27.

Table 27: Percentage of mothers who know women in her community who influence others and who motivate practices and beliefs that are advantageous

	Baseline		Endline	
	Control	**Intervention**	**Control**	**Intervention**
	%	**%**	**%**	**%**
All mothers	44.2	47.2	56.4	55.2
Stratified by maternal education				
No education - illiterate	49.5	40.6	58.8	49.3
Any primary education	44.8	51.8	58.3	56.6
Any secondary education or more	36.5	47.1	52.1	57.7
N	294	305	303	299

Do you try to help other women so that they have practices and beliefs that are advantageous? At BL and EL about half of women said that they helped and advised other women, suggesting that there is a climate of sharing of information and mutual help. At both BL and EL, there was a gradient of the proportion of mothers who try to help other women, correlated with level of maternal education. The one group that had an 10 point increase from BL to EL were the illiterate mothers in the intervention group. See Table 28.

Table 28: Percentage of mothers who try to help other women so that they have practices and beliefs that are advantageous

	Baseline		Endline	
	Control	**Intervention**	**Control**	**Intervention**
	%	**%**	**%**	**%**
All mothers	53.1	49.8	52.8	53.8
Stratified by maternal education				
No education - illiterate	48.4	37.5	44.1	47.9
Any primary education	53.6	56.7	51.8	52.5
Any secondary education or more	58.1	52.9	60.4	59.6
N	294	305	303	299

Do you feel sad most of the time? In all surveys a number of women said that they felt sad most of the time. This became less common at EL. See Table 29.

Table 29: Percentage of mothers who feel sad most of the time

	Baseline		Endline	
	Control	**Intervention**	**Control**	**Intervention**
	%	**%**	**%**	**%**
All mothers	17.7	20.3	13.5	14.4
Stratified by maternal education				
No education - illiterate	16.8	15.6	13.2	15.1
Any primary education	18.4	23.4	8.6	16.4
Any secondary education or more	17.6	20.6	20.8	11.5
N	294	305	303	299

iii. Results of the qualitative assessment of "Sharing Histories"

At the end of the project, a qualitative study was conducted for the purpose of providing explanatory background on results of the quantitative study. Three categories of project partners were interviewed as key informants: 6 WL, 6 CF, and 6 Tutors. Additionally, two of each these categories of informants in the intervention group were also interviewed to provide contrast. Analysis of the in-depth interview transcriptions was done by a trained medical anthropologist using the Atlas Ti software package.

The first overriding finding of the qualitative assessment was the confirmation that using women as community health workers, either as Community Facilitators or Women Leaders, was a successful project strategy. These women had more free time and older children. The fact of being an "older" woman fit positively into the traditional perception of intergenerational teaching. Their knowledge came not only from the "outside" with training and teaching materials (flipcharts) but also from the "inside" with knowledge based on their experience, which is the traditional way of learning in local culture. Women Leaders were able to link with other women in their communities in a way no other health worker can, being one of them, but with training that legitimizes their linkage with the health center in addition to their recognition by community leaders and members. A symbol of the linkage with the health sector is their use of the flipchart which, using an analogy, is to the WL as a textbook is to a teacher.

The qualitative assessment on "Sharing Histories" found that the type of training "not only had influence on the learning process, but also in the subsequent work of the Woman Leader." WL had spontaneously identified the methodology´s potential and used it during their home visits to educate women in communities. WLs did this by sharing their own experience in confidence with the mother (a neighbor of the WL), and in turn asked the mother to share her experience. These experiences were compared and contrasted with the messages on the flipchart to reach an understanding of how past perceptions of how to do things had been commonplace among all women, and therefore not to be ashamed of or criticized, but recognizing now that these ways may not have been always correct. This type of discussion serves to reinforce the messages and is more likely to lead to behavior change. Furthermore, they recognized through the training process that certain practices could be improved on with newfound knowledge transmitted through flipchart images.

To explain this situation, several explanatory hypotheses were proposed:

1. The methodology connects to the ancestral conception of knowledge that is based on experience. “People gain knowledge because they were correct, or because they had made a mistake.” This point is synergistic with the intergenerational relationship between the WL and women in her community.
2. The methodology trained WLs in the art of public speaking from her own being and doing. The process of sharing their personal experiences with other WL, CF, and Tutors in safe workshop environments served to train WLs to raise their own voice, because they did not repeat what others said but made their own speech without fear of being contradicted. This was because they spoke from their own experience, of which no one knew more than them. Since error or malpractice was not an individual but collective censorship, it could be considered that the "culture" protected them from possible censorship. Once expressed, the discussion could go forward on the correctness or not of what had been practiced, without incrimination. A shared acceptance of new learning could occur so that WL knew better what to do in the future for themselves and their families. As well, they would be able to share this newfound knowledge with other women with greater conviction.
3. WL themselves had found the strategy of “Sharing Histories" to be useful to them in home visits to establish connection or empathy with other mothers, and to obtain and transfer information,
4. Finally, the act of exposing their own stories might have a therapeutic role, both for the WL as well as for mothers in the community, to the extent that it was necessary to develop a timeline, an explanation of what happened and somehow, create distance from it by making it the object of reflection by other women.

WL interviewed for the qualitative assessment expressed their satisfaction for the increased valuation they felt from their children and their husbands, and from their community that called them to meetings and consulted with them on community decisions. This speaks to a transformation in the self-esteem of women, in a greater social agency, and in a local culture that can change for women.

IV. DISCUSSION AND RECOMMENDATIONS

4.1 Main conclusions

The aim of the "Health in the Hands of Women" project was to implement an integrated strategy to establish a sustainable community-based health promotion program that would improve maternal knowledge and home behaviors on key practices to prevent chronic child malnutrition, or stunting. The overall project intervention was to strengthen the primary health care system and its links with local government and communities, and the development of a system to reach mothers in the home through female community health volunteers (Women Leaders-WL) who would be trained by government health personnel trainers. Within this larger project, an operations research study was embedded with the intent to demonstrate that use of the innovative teaching method, "Sharing Histories," to teach WL would make them more effective change agents to improve maternal and child health in their community, as compared to use of a standard teaching method. The study measured this potential effect through household interviews and child anthropometry in communities served by WL in order to detect any changes in maternal knowledge and behaviors and, as a result, on prevention of stunting.

One half of the Women Leaders (WL), also known as female community health workers, were trained with the "Sharing Histories" methodology as the intervention group, and the other half of WL, from clusters of health facility jurisdictions that were randomly assigned to the control group, received training in the same topics using the same flipchart materials and messages, but with a standard teaching method. In "Sharing Histories", WL were asked to share their own personal experiences with pregnancy, birth, child feeding and other key issues for child health, and on that basis begin to analyze traditional knowledge, beliefs and practices among peers, then to move forward to accepting and learning new forms of knowledge and practice. This was different from standard CHW training which was, while participatory to some extent, oriented to provision of knowledge from the trainer.

The overall results of the project intervention provides strong statistical evidence that provision of health education to mothers significantly changes maternal knowledge and behaviors, especially for knowledge on danger signs, child feeding practices, and on indicators of women´s empowerment. This effect was found in both groups: women who received home visits and education from WL taught with "Sharing Histories", and others who received health education from WL taught with standard CHW teaching methods. Comparing the two groups, we found that the innovative teaching intervention provided better results, but mainly for more educated mothers. In contrast, the children of illiterate mothers had high rates of stunting both at baseline (BL) and at endline (EL) in both the control and the intervention groups.

The finding of no reduction in stunting in children of illiterate mothers could be explained by one or more of the following reasons: (1) These mothers were unable to learn project messages, (2) In spite of learning the messages, they did not have the resources necessary to implement the behaviors, or (3) The possible presence of the so-called environmental enteropathy, which causes nutrient malabsorption.[xii] Nevertheless, the results of this study did show that illiterate mothers, both intervention and control, were in fact able to improve many or most of the key behaviors promoted by the project. These changes did not carry through to improved growth in their children. Among illiterate mothers, indicators of women´s empowerment showed some improvements in the intervention group as compared to the control group at EL.

A strong correlation of increased stunting by child age was found in this study, which indicates the need for prevention in early life through exclusive breastfeeding, appropriate complementary feeding, effective prevention of preventable diseases, early treatment of prevalent diseases in children, prevention of maternal stress, and others in order to maintain a normal rate of growth from the time of birth.[xiii] [xiv] Best of course is to begin preventive actions during the fetal period. The improved growth (lower rate of stunting) in the intervention group was especially noted in the 0-5 month and 6-11 month age groups, suggesting that changed maternal behaviors during this period of the child´s life had the most effect on preventing stunting before it occurred.

The exposure of mothers to visual materials such as a flipchart was associated with a lower prevalence of stunting in their children, if they were in the intervention group as compared to the control group. The level of maternal education (illiterate, any primary education, or any secondary or higher) was not associated with this finding, since the distribution of mothers by educational level was similar in both study groups. We speculate that the better outcome in stunting in the exposed intervention group was associated with the effectiveness of that exposure. It is possible, in other words, that the Women Leaders (WL) and Community Facilitators (CF) who had been trained using the "Sharing Histories" methodology were more empowered, more self-confident, and more able to effectively convince mothers to change behaviors that would improve child growth, as compared to the control group of mothers who were also exposed, but with less effective impact.

The study shows that improvements in child growth can be gained through a well-organized educational program in the home that achieves behavior changes in mothers. The effective involvement of WL to achieve this behavior change in mothers may have been enhanced by the utilization of the culturally appropriate "Sharing Histories" methodology.

4.2 Summary of most important evidence supporting conclusions

Stunting at baseline (BL) was about 35% in both control and intervention groups. In the control group, stunting remained the same across all surveys. The intervention group was reduced at midterm (MT) then increased slightly at endline (EL) (BL 34.4% - MT 27.9% - EL 30.3%). At EL there was still a 5.2% difference in stunting between the two study groups. See Graph 3 on page 22.

Stunting in the two study groups interacted with level of maternal education and age of child. These two factors, maternal education and child age, are both directly highly correlated with child stunting: the former in a negative association, and the latter with a positive association (see Graphs 4 and 5 in the Appendices to this report).

The decline in stunting at MT occurred mostly in intervention mothers with secondary education, suggesting that they were early adopters of healthy behaviors and attitudes. At EL, lower stunting in the intervention group mainly occurred in mothers with any primary education, possibly suggesting that these were later adopters of the promoted practices. Even illiterate mothers significantly improved some health knowledge and behaviors, but these changes were not accompanied by the prevention of stunted growth in their children that remained high over 40% throughout the project period, whether they received information from WL trained with "Sharing Histories" or from WL trained in a traditional method.

At MT and EL, the youngest children (0-5 months and 6-11 months) in intervention areas had the lowest levels of stunting, suggesting that birth weight, prevention of preventable childhood diseases, and/or early breastfeeding practices were more favorable in this group. Early prevention of stunted growth measured at

MT and EL in 0-11 month-old children of the intervention group coincided with less stunting at EL in children 6-17 months of age, especially in the intervention group. In other words, early improvements in the 0-5 and 6-11 month-old age groups in children of the intervention group by midterm seemed to have positive repercussions at EL in children 6-11 and 12-17 months of age. By EL, the control group also showed prevention of stunting in the 0-5 month age group, possibly as an effect of their mothers practicing good health and nutrition behaviors.

Earlier improvements were found in the intervention group over control group in maternal knowledge and behaviors, as shown in results of the midterm (MT) survey.

Mothers in both the intervention and control areas had similar exposure to project messages as measured by number of home visits received by WL. However, intervention mothers were more likely to provide correct answers to questions that test their understanding of project messages.

Mothers in the intervention areas more rapidly took up learning in the first part of the project, as shown by their significantly improved behaviors in breastfeeding and hygiene practices at the midterm evaluation, which were associated with decreased stunting as compared to the control group.

A suggestion of improvements in aspects of women's empowerment that is associated with the teaching methodology "Sharing Histories" were found in the trend for intervention mothers to express more independence and decision-making ability on the indicators of women´s empowerment that were asked in KPC survey questions. Data showed that mothers in both study groups had a significant improvement in perceived ability to make decisions to obtain health services between BL and EL. However, the intervention group reported a generally greater reduction in perceived barriers to health care access as compared to the control group between BL and EL on the items of needing to ask permission to seek health care, finding transportation, and not wanting to go along to seek care. The proportion of mothers who were satisfied with their contributions to the community was reduced at EL, especially in the more educated mothers, perhaps reflecting a greater level of self-awareness, which is a good sign. Among illiterate mothers in the intervention group at EL, there was a tendency to report that they try to help other women so that they have practices and beliefs that are advantageous.

4.3 Study limitations

This study attempted to implement a training intervention through the government primary health care system, to train female community health workers so that they would serve as change agents in their communities, visiting mothers in the home to teach them about key knowledge and practices to improve health of mothers, newborns, and children. Study limitations are therefore related to health system factors outside the control of the researchers. Primary among these was the relatively frequent turnover of health personnel who had received project training. Retraining of the new personnel could not always be immediate. Other such factors were time availability of health personnel trainers, their level of motivation, and their receipt of support in this role from their superiors in the health system.

A further limitation was the sample size. Though the sample size was twice a large as normal KPC studies to account for comparisons between the intervention and control group, there were important differences found within subgroups by levels of maternal education even in this rural population. Therefore, a larger sample size would have allowed better detection of the significance in differences between the groups.

4.4 Findings from other studies

Other studies in Peru have found a similar tendency for lack of impact on chronic malnutrition among children of illiterate mothers, despite being exposed to an intervention that did provide an attributable impact on stunting in children of better educated mothers. One of these was an evaluation of impact of a national conditional cash transfer program in Peru, called Juntos, on rates of chronic malnutrition. The Juntos Program provides a monthly cash transfer to mothers in the poorest districts on the condition of receiving preventive maternal-child health services and keeping children in school. No educational or informational component is provided to mothers. Stunting was reduced only in better educated mothers who apparently were able to put the added cash to better use for the benefit of their children. [xv]

The other study with similar findings on the differential effect on stunting by maternal education was an evaluation of a large-scale food supplementation and maternal education program implemented by the Adventist Development Relief Agency (ADRA) in Peru in the late 1990´s (a PL-480 program), in which one of the main predictors of stunting at the end of the program was Quechua as the main language of the mother (most commonly found among the least literate women). [xvi]

4.5 Implications and recommendations

The study suggests that the methodology used for teaching community health workers is an important issue to consider when developing training programs for community health. We found that it is feasible to being prevention of chronic child malnutrition (stunting) through a community-based health promotion that involves volunteer community health workers trained with appropriate teaching methodology in addition to appropriate teaching and learning materials for teaching and monitoring mothers and children in the home.

The study confirms the need for further research and development of interventions to low-literacy mothers that will support conditions for reducing chronic malnutrition in their children.

We recommend that this study be replicated on a larger scale, again with a cluster randomized controlled trial, to more precisely measure any differences between study groups based on the type of educational methodology utilized, with a focus on understanding differences by level of maternal basic education or literacy.

V. Conclusions, Recommendations, and Use

Overall, both study groups had significant improvements in MNCH knowledge and practice due to the overall project strategy. Within that we detected a tendency, not statistically significant, for better results on MNCH knowledge, practice, and empowerment indicators as well as on prevention of child stunting in the intervention as compared to the control groups, which were differentiated only by type of educational methodology for women leaders. The qualitative assessment on use of the methodology of “Sharing Histories” as a way to teach Women Leaders was revealing in terms of the mechanisms by which this teaching method works to increase the level of empowerment of female community health workers (CHW) and of mothers in their communities. In a male-dominated society, improvements in women´s empowerment will not necessarily have immediate significant impact on maternal and child health indicators as an independent factor. However, this

operations research study suggests that teaching female CHW with properly trained trainers, with supervision for CHW, and with instruments for CHW to teach mothers in the home are key ingredients for community health promotion, and that, additionally, the use of the “Sharing Histories” methodology is a way to reach mothers in a culturally appropriate way that helps women improve their self-confidence to speak out with others, provides them practice to express their own thoughts and experiences, and helps them to develop the social agency to become more independent decision-makers for the benefit of themselves, their families and their communities.

Appendices

Final Protocol

KPC Survey Instrument

Sample training material - Facilitator Manual “Module II: Pregnancy” that applies the methodology “Sharing Histories”

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