

# Strengthening Maternal and Infant Health in an impoverished peri urban community in Lima, Peru: The SAMI Project

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## **Abstract**

While Peru has made strides in preventing maternal mortality, a more comprehensive and systematic approach towards reducing maternal morbidity and improving infant health is critical. In this paper, we present the preliminary results of the ‘Strengthening Maternal and Child Health in the District of Carabayllo’ or SAMI Project, developed by non-governmental organization Socios en Salud (Partners in Health). The project offers an innovative and multifaceted community approach to preventing maternal morbidity through management of the clinical, emotional, and nutritional health needs of pregnant women, postpartum women and infants in Lima, Peru. In collaboration with local stakeholders and the Peruvian Ministry of Health, the intervention utilizes the critical role of Community Health Workers as project collaborators. Local NGO team members include project coordinator, psychologists, nutritionists, and midwives. Women are enrolled during pregnancy, give birth during the project, and are monitored alongside their infants until 1-year post birth. Project activities include accompaniment to clinical health appointments by community health workers for women until 45 days post birth, birth education classes in the second trimester, birth planning, depression screening, and the World Health Organization’s (WHO) ‘Thinking Healthy Programme’ to reduce symptoms of mild to moderate perinatal depression. Between August 2016 to August 2018, 89 pregnant women were screened for SAMI participation and until August 2018, 59 women participated in the intervention. 75% had completed 6 or more prenatal visits. 35% had anemia at some point during their pregnancy and 24% of participants screened positive for depression and participated in the Thinking Healthy Programme. Of the 40 participants who had given birth, 92.5% of newborns had normal birthweight between 2.5 to 4 kilos. These initial results are encouraging, and the project anticipates positive results in new communities where it will be extended in the future. Additionally, the project serves as a model for comprehensive maternal infant health services in low-income communities.

**KEY WORDS:** Breast Feeding; Comprehensive Health Care; Depression; Maternal-Child Health Services, Maternal Health, Depression, Postpartum.

## Riassunto

Mentre il Perù ha fatto dei progressi nella prevenzione della mortalità materna, un approccio più completo e sistematico per la riduzione della morbilità materna e per il miglioramento della salute infantile è cruciale. In questo lavoro, presentiamo i risultati preliminari del progetto “Strengthening Maternal and Child Health in the District of Carabayllo” o “SAMI Project”, sviluppato dall’Organizzazione non Governativa (ONG) Socios en Salud (Partners in Health). Il progetto offre un approccio comunitario innovativo e multivariegato per la prevenzione della morbilità materna attraverso la gestione delle necessità di salute cliniche, emozionali e nutrizionali delle donne in gravidanza, delle donne nel periodo post-partum e dei neonati a Lima in Perù. In collaborazione con gli stakeholders locali ed il Ministro della Salute peruviano, l’intervento utilizza il ruolo fondamentale svolto dagli operatori sanitari della comunità come collaboratori del progetto. I membri del team della ONG locale includono il coordinatore del progetto, psicologi, nutrizionisti ed ostetriche. Le donne sono arruolate durante la gravidanza, partoriscono durante il progetto e sono monitorate insieme ai loro neonati fino ad 1 anno dopo la nascita. Le attività del progetto includono l’accompagnamento agli appuntamenti presso le cliniche da parte degli operatori sanitari della comunità per le donne fino a tre mesi dopo il parto, corsi di educazione per il parto al secondo e terzo trimestre, lo screening per la depressione, ed il programma dell’Organizzazione Mondiale della Salute denominato “Thinking Healthy Programme” per ridurre i sintomi di lieve e moderata depressione perinatale. Tra l’agosto del 2016 e l’agosto del 2018, 89 donne in gravidanza sono state sottoposte a screening per partecipare al progetto SAMI ed, all’Agosto 2018, 59 donne avevano partecipato all’intervento. Il 75% aveva completato 6 o più visite prenatali. Il 35% aveva riportato anemia in qualche fase della gravidanza ed il 24% dei partecipanti era risultato positivo allo screening per la depressione ed aveva quindi preso parte al “Thinking Healthy Programme”. Dei 40 partecipanti che avevano partorito, il 92,5% dei bambini aveva un peso alla nascita normale compreso tra 2,5 e 4 kilogrammi. Questi risultati iniziali sono incoraggianti ed il progetto preannuncia risultati positivi in nuove comunità dove esso sarà esteso in futuro. Inoltre, il progetto serve come modello per garantire dei servizi sanitari completi per madri e neonati in comunità a basso reddito.

### TAKE-HOME MESSAGE

*The preliminary results of the SAMI Project, which has been developed to offer a comprehensive maternal and infant health community-based intervention in Lima, Peru, are encouraging and the project anticipates further positive results in future communities where it will be extended. Additionally, it serves as a model for comprehensive maternal child services in low-income communities.*

**Competing interests** - none declared.

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## INTRODUCTION

Maternal infant health is a global priority. The objectives established in the 2016 for the 2030 Sustainable Development Goals include ending preventable maternal, newborn, child and adolescent deaths and stillbirths. In 2013, Peru alongside with 25 other Latin American countries representatives signed the 'Panama Declaration' at the 'A Promise Renewed for the Americas' conference aimed at improving maternal child health, by tackling the persistent health inequalities rampant in the region [1]. The Conference's objectives aligned with the fifth Millennium Development Goal outlining the need to reduce maternal mortality. Peru set the goal of 66.3 deaths per 100 thousand live births for the 1990-2015 period [2]. In 2015, the country nearly met this goal with 68 maternal deaths per 100,000 live births [3]. While Peru has made strides in preventing maternal mortality, a more comprehensive and systematic approach to reduce maternal morbidity and improving infant health is critical. Maternal morbidity is a health condition "aggravated by pregnancy and childbirth that has a negative impact on the woman's wellbeing" [4]. Important elements to prevent maternal morbidity are comprehensive prenatal care emphasizing emotional and nutritional health. Carabayllo is one of the poorest and most vulnerable districts of Lima, Peru. Located in the Northern region of Lima, Carabayllo has a population of approximately 311,332 people. Carabayllo's poverty rate of 23.15% is more than double that of Metropolitan Lima at 14.8% [5]. According to a 2017 Ministry of Health Analysis for the Health Districts of Northern Lima (DIRIS), only 35.8% of pregnant women attended 6 prenatal appointments, and 23.1% suffered from anemia at some point during their pregnancy [5]. Socios En Salud (SES), the Peruvian branch of the international health and human rights organization Partners in Health has worked in the Carabayllo district since 1996, pioneering the community care model for multidrug-resistant tuberculosis treatment. This model has been adopted throughout the world [6]. Currently, SES offers several high-quality, com-

munity-based interventions giving 'the preferential option to the poor' [7]. This is done in close collaboration with Community Health Workers (CHW), who are non-professional community members trained to provide direct patient care and education on a variety of health topics such as tuberculosis, maternal health, infant development, perinatal depression and sexual and reproductive health. In 2016, the intervention 'Strengthening Maternal and Child Health in the District of Carabayllo' (The SAMI Project) was created in order to offer an innovative and multifaceted community-based approach to prevent maternal morbidity and improve maternal child health in Peru. The intervention area is the community served by a local health center in Carabayllo administrated by the Peruvian Ministry of Health (MINSa). The aim of this paper is to describe the SAMI project developed in Carabayllo and to present its preliminary results.

## RESULTS AND DISCUSSION

### *Structure of the SAMI intervention*

Mindful of the unique needs of three participant groups (pregnant women, postpartum women, and infants), the intervention addressed complex and changing needs through three areas: Clinical health, nutritional health, and emotional health. Our effort was to provide a unique, low-cost, and highly adaptable intervention collaboratively with local government utilizing the critical role of community health workers to support participants through each stage. This model considers multifaceted needs and goes beyond simple clinical visits. CHWs offer an enriched community element and connect with participants not merely during health center visits but through home and community visits. This generates a broader notion of care that is not only comprehensive, but community-generated at the same time.

### *Staffing and recruitment*

The team of SAMI professionals includes project coordinator, field coordinator, mid-

wife, nutritionist and psychologist. In addition, our team includes community health workers trained in maternal infant health care. The project's specific goal is to strengthen the clinical, nutritional and emotional health of maternal-infant pairs during pregnancy and the first 12 months of the infant's life through a comprehensive approach of community accompaniment [8].

The intervention begins with an active community search for pregnant women. Women who have not initiated care are invited to a local health center where they are enrolled in the SAMI project during their first trimester. Other participants are identified by a registry of pregnant women at the health center. Ministry of Health staff directly invite pregnant women to participate in the SAMI project. The only participation inclusion criteria is living in the intervention area and being within the first trimester of pregnancy. Newborn infants born into the SAMI intervention area are automatically included by the age of 12 months.

A member of the SAMI team visits eligible participants together with a Community Health Worker (CHW) to explain the purpose of the intervention. As partners to the Peruvian Ministry of Health, an important element of our work is supporting progress towards the Peruvian government's maternal and child health goals. As such, SAMI's established visit schedule directly coincides with MINSA guidelines.

### *Targeted interventions for pregnant and postpartum women*

#### Clinical health

##### *Prenatal and postnatal visits*

Our clinical-based intervention for pregnant and postpartum women begins in the first trimester and lasts until 45 days post birth through three components: Pre and postnatal visits, birth education, and birth planning sessions [8]. Women are immediately assigned a CHW after agreeing to participate in the intervention. After, the CHW visits women at home regularly reminding them of upcoming

pregnancy appointments. CHWs also reinforce important prenatal health information including signals of alarm during pregnancy. CHWs accompany women to visits at their local health establishments as a support and resource. CHWs are trained and coached to interact with participants, make eye contact, embrace and connect personally.

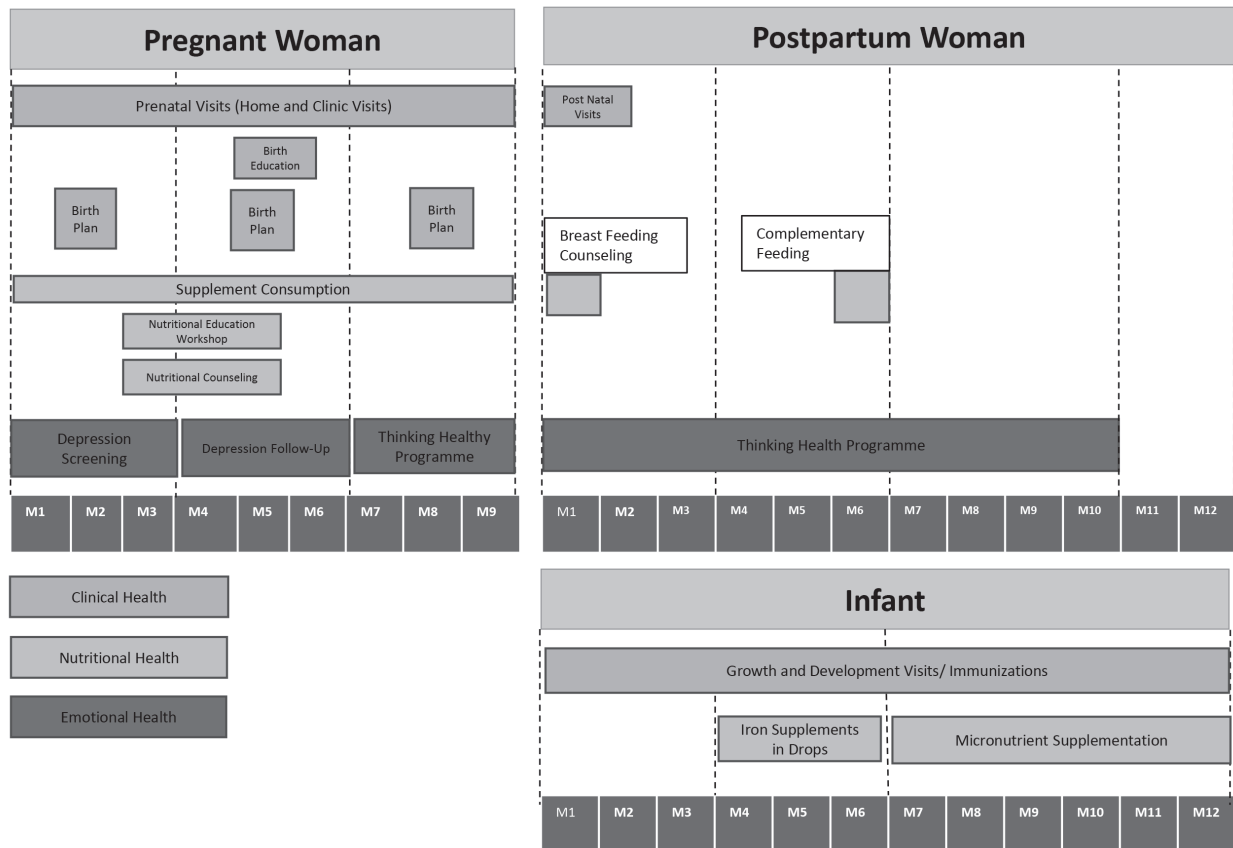
In coordination with health center staff, the objective of each prenatal visit is to complete all standards and clinical examinations referenced in the MINSA Prenatal Health Technical Standard per week of pregnancy [9]. In coordination with MINSA, the specific prenatal visit objectives are to monitor the health of the woman; identify pregnancy warning signs (nausea, frequent vomiting, loss of blood, absence of fetal movement, fever greater than 38 °C); and respond quickly to concerns during pregnancy. The SAMI midwife supervises the CHWs and gives regular feedback about their work.

##### *Birth education classes*

The second component of the clinical intervention for pregnant women includes birth education classes through 6 weekly 2-hour sessions starting at the 5<sup>th</sup> month or 20 weeks. During these prenatal training sessions, women are educated on pregnancy, breathing exercises to prepare for the upcoming birth, and newborn care. The main goal of these sessions is to ensure the safest, fastest, and most manageable birth experience possible. In coordination with local Municipalities and MINSA, these sessions take place at a Carabayllo community center. CHWs are responsible for preparing these meetings, providing logistics and attending sessions with participants. Participants' partners are welcome to attend, and all are encouraged to connect socially during the sessions.

##### *Birth plans*

The third element of our clinical intervention for pregnant women is birth planning and counseling at the individual, family, and community levels over three visits. The first birth planning conversation takes place with wom-



**Figure 1.** SAMI intervention components for woman and infant.

en individually at the health center. The second involves her partner and family members at home, and the third visit familiarizes and alerts community members of the birth plan. Birth planning activities include documentation of who will: accompany the birth, care for her children, transport her to the hospital, and provide emergency blood donation if needed. Specific items needed during birth (e.g., diapers, robe, etc.) are also documented in the plan.

SAMI participants normally give birth at a nearby Maternal Infant Center in Lima. Seven days after giving birth, CHWs remind and accompany participants to attend postnatal visits at the health center. A second visit is scheduled 28 days later to monitor postpartum complications including mastitis, post labor birth hemorrhage, arterial hypertension, and surgical scar infection.

### Nutritional health

The nutritional health component for preg-

nant women focuses on supplement consumption throughout pregnancy, nutritional counseling and education. Postnatal nutrition activities include counseling on breastfeeding and education on complementary feeding.

### *Supplement consumption*

In accordance with MINSAs guidelines, SAMI pregnant participants are instructed to take supplements throughout their pregnancy from their government-supported health establishment. Supplements include folic acid in the first trimester and combined folic acid with ferrous sulfate in the second and third trimesters. These supplements prevent anemia associated with low newborn birth weight. CHWs visit participants to document regular consumption of these supplements, while the SAMI team nutritionist accompanies and monitors these activities in the field.

### *Nutritional education workshops and nutritional counseling*

In the second trimester, the SAMI nutritionist delivers educational workshops on healthy eating habits through hands-on cooking demonstrations using low-cost, nutritious foods from local markets. CHWs provide home-cooked snacks and participants cook together during many sessions to practice specific recipes and techniques. Educational topics include food preparation at home, anemia and iron supplementation, weight control during pregnancy, and breastfeeding. The project nutritionist attends these meetings to ensure correct information is presented and answer questions. The SAMI nutritionist also provides nutritional counseling directly to participants in their homes. Education at home bridges social contexts and adapts to each kitchen and family.

### *Breastfeeding counseling*

Exclusive breastfeeding practice refers to when only breast milk is given to the baby for the first six months of life without additional food or water. Breastfeeding is the optimal way to feed infants [10]. To encourage exclusive breastfeeding after birth, the project nutritionist offers 3 breastfeeding support sessions at participant's home in the first month after giving birth. These sessions ensure exclusive breastfeeding practice is taking place, correct techniques are utilized, and any problems are addressed.

### *Complementary feeding education*

Complementary feeding refers to foods and liquids given to children in addition to breast milk during the transition period to eating whole foods [11]. CHW offers 3 nutritional workshops on complementary feeding techniques for postnatal women with infants at 6 months. In these sessions, women are taught healthy meals to cook. These workshops are also monitored by the SAMI nutritionist to ensure the CHW delivers correct information.

### Mental health

Perinatal depression affects up to 25% of women in low-and middle- income countries [12]. It increases the risk of negative

health-related behaviors and obstetric complications including poor nutrition, increased substance use, inadequate prenatal care, pre-eclampsia, low birth weight, preterm delivery, postpartum depression, and suicide [13]. Aside from a significant personal toll, a mother's untreated depression can lead to impairments in the child's emotional, social, and cognitive development; rarely infanticide can even take place [14]. In Peru, perinatal depression prevalence is estimated at 40.1% [5]. For this reason, we decided to integrate the World Health Organization's 'Thinking Healthy Programme' (THP) into SAMI [6].

### *Depression screening and follow up*

All SAMI participants are screened for depression using the Patient Health Questionnaire (PHQ-9) depression screening tool in their first trimester [15]. Those who screen positive for 'mild' depression receive psychoeducation in their first trimester and those with moderate levels of depression are referred to the District Community Health Center. Depression follow up is offered in the second trimester. Those with 'mild or moderate' depression are offered the 'Thinking Healthy Programme' starting in the third trimester (30 weeks), while those who score 'moderately severe' to 'severe' depression (i.e., PHQ-9 score ranges from 15 to 27) are followed-up with referrals and accompaniment to the District Community Mental Health Center through their second trimester. Participants receive evaluation and pharmacological intervention as needed.

### *Thinking Healthy Programme (THP)*

THP is a community health worker perinatal depression intervention where cognitive-behavioral therapy techniques and infant development education are used to reduce symptoms of mild to moderate perinatal depression. This is done while encouraging positive bonds between mother and infant. This focus not only supports women in choosing alternative healthy thoughts and behaviors but also improves infant care behavior [15]. THP was chosen by Socios en Salud after consultation with MINSa and the WHO

[16]. Starting at the 7<sup>th</sup> month of pregnancy through 10 months postpartum, participants receive THP at home delivered by CHWs.

### ***Targeted interventions for infants***

#### Clinical health

##### *Growth and development appointments/immunizations*

According to the National Technical Standards for infant health, newborns should complete growth, development, and immunization appointments through 12 months of age [17]. The same CHW assigned to the mother also attends these infant visits, where staff evaluate infant weight, size, immunization status and psychomotor development.

#### Nutritional health

##### *Iron supplements and micronutrient supplementation*

To prevent anemia in children associated with poor cognitive development, MINSA provides iron supplement drops to infants through the fourth and fifth months [18]. From the sixth month through the twelfth month, powdered micronutrients are provided. CHWs are instructed to remind participants that these must be added to solid food. These micronutrients include iron, folic acid, zinc, vitamin A, and vitamin C. CHWs observe infant consumption of iron drops and micronutrients every 7 days through home visits similar to the pregnant women.

##### *The preliminary results of the SAMI Project*

From August 2016 to August 2018, 89 women were screened for SAMI participation. Of these, 18 women declined participation and 12 were lost to follow up. As of August 2018, 59 women (66,29%) were participating in our intervention. The average age of participants was  $25,02 \pm 5.86$  years. Of pregnant ( $n = 19$ , 32.2%) or postpartum ( $n = 40$ , 67.7%) participating women, 19% were adolescents ( $15 \pm 2,3$  years; range: 15-19). 72% of the partic-

ipants had not completed either primary or secondary school. 33% were from geographical areas outside of Lima. 23.7% of participants were single ( $n = 14$ , 23.7%) and far more were married or living with a partner ( $n = 45$ , 76.2%). Many of them ( $n = 44$ , 75%) have already completed 6 or more prenatal visits, while the others were in process of completing these visits. 70% had completed all 3 birth plans. About one-third ( $n = 20$ , 35%) of the participants were affected by anemia during their pregnancy. 61% have completed 3 nutritional advice sessions. 24% of participants screened positive for depression and participated in the 'Thinking Healthy Programme'. Of the 40 participants who had given birth, 92.5% of newborns had a normal birthweight between 2.5 to 4 kilos. Three CHWs reported THP was their favorite part of the intervention as it provided extended emotional care and support to participants at home focusing on problem areas and facilitating longer term connections. CHW staff have also reported skills learned during THP training, which have improved their own relationships.

##### *Challenges and implications for policymakers*

The preliminary results of the SAMI project show that participants are actively participating in the program including the specialized services for depression and nutritional education. Many of women gave birth to babies with normal birth weights, thus we can assume this program can be effective. The SAMI Project is multifaceted and seeks to offer a more community-based and comprehensive maternal infant healthcare intervention in collaboration with MINSA. Such interventions are often challenging in their management, community health worker involvement, and partnership with diverse stakeholders. One of the most important challenges has been generating openness and engagement among all stakeholders, however, we have been successful incorporating local government actors through progress reporting. Another important challenge has been to support leadership in the CHW. The SAMI project has offered ongoing training to edu-

cate and support these team members. Challenging group dynamics with a team-based approach to problem solving and emotional support have been addressed. The team meetings at our local community center are aimed to listen and support one another to face the challenges of the work.

The preliminary results of this study showed the capability of community health workers to provide supportive accompaniment to pregnant women and children by responding to problems quickly. One of great strengths of the project is the comprehensive support of the participants. Also, while a high turnover rate can be a challenge among those working in maternal child services, our work is aimed to establish stronger partnerships with health professionals.

In the future, the SAMI project will include new activities for an extended intervention period of 24 months post birth for two reasons. First, to expand our focus towards the first 1,000 days of life (pregnancy through the child's second birthday) as the critical window for growth and development. The second reason is to fully capture all MINSA health indicators requiring a longer timeline. Therefore, we have proposed the following objectives: 1) to expand our intervention to more local health centers; 2) to increase our active search for participants with a door-to-door search of perinatal women who may have

not received care at local health centers; 3) to include an infant development intervention (0 to 6 months) using 'giving and responding' methodology through videos [19]; 4) to strengthen the capacities of both local health professionals and SAMI team in maternal and infant health topics and others such as testing for sexually transmitted infections, and screening for Tuberculosis, diabetes, hypertension, etc.

## CONCLUSION

The SAMI Project offers a multifaceted, low-cost, and highly adaptable model of comprehensive maternal infant care for low-income settings. The project goes beyond traditional concepts of health and considers emotional and nutritional health needs using highly valued community health workers. Initial results of our pilot intervention are encouraging, and the project anticipates positive results in new communities where it will be extended in the future. Also, the project plans to include new activities, and an intervention period of two years post-birth. The SAMI project serves as a useful model for comprehensive maternal infant health services in low income communities.

## *Acknowledgements*

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