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Evaluating the Determinants of Participation of Pregnant Women in the “Preventing Malnutrition in Children Under Two Years of Age Approach” (PM2A) Program in Alta Verapaz, Guatemala*

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I. Introduction

A window of opportunity exists to prevent malnutrition and thus increase a child’s cognitive development and longtime expected earning potential. Nutrition interventions conducted during the window of opportunity, defined as before pregnancy until a child reaches 24 months of age, are critical to long term development, as damage to physical growth and brain formation during this time period is irreversible. Effectively implementing nutrition interventions, however, is difficult, since program implementers may not understand why some individuals choose to participate and others do not; consequently the number of beneficiaries that utilize program services is not optimized (Shekar et. al., 2006). If program implementers understood the determinants of participation, they could potentially adjust intervention methods and/or outreach activities.

The objective of this paper is to evaluate the determinants of participation of pregnant women in the “Preventing Malnutrition in Children Under Two Years of Age Approach” (PM2A) in Alta Verapaz, Guatemala as a function of the benefits and costs of the program, and the women’s status and decision-making power in the household. Understanding the determinants of participation in the PM2A program is a critical step in ensuring that program implementers reach all potential program beneficiaries and that services are not underutilized. The PM2A program is a United States Agency for International Development (USAID) Multi Year Assistance Program (MYAP) funded out of the Public Law 480 Title II resources and is implemented by Mercy Corps. The

PM2A program has three core components: distribution of family and individual food rations; required participation of beneficiaries in a behavior change communication (BCC) strategy focused on improving health and nutrition related behaviors; and required use of preventive health services for pregnant and lactating women and children less than 2 years of age. The PM2A program also incorporates a research component being undertaken by the International Food Policy Research Institute (IFPRI) in collaboration with Mercy Corps.

We begin the paper by explaining the importance of implementing nutrition interventions during the window of opportunity. We then discuss the PM2A program and research components that are currently been undertaken in Guatemala with the collaboration of Mercy Corps. In the third section, we describe the survey of pregnant women in the PM2A program research areas and present descriptive statistics of pregnant women and their households in the fourth section. In the fifth section the econometric model is presented, while in the sixth we present the results. Finally, we conclude with a discussion of the results and their implications for the effectiveness of PM2A programs in reaching women during pregnancy.

II. Literature Review

Recent research indicates that nutrition interventions for children past two years of age are sub-optimal in preventing stunting (height-for-age Z-score (HAZ) < -2 standard deviations (SD)) as compared to nutrition interventions focused on children less than two years of age. Before two years of age children need high amounts of calories and stunting can be prevented (Grember, et.al, 2010), but after this date, stunting is nearly irreversible (Ruel, 2010). Studies show that the patterns of faltering in vertical growth

and weight gains are consistent across regions of the developing world; vertical growth faltering occurs in the first two years of life and children of developing countries have an increased risk of being undernourished between 12-24 months of life.

The costs of stunting and undernutrition are large. Stunting in childhood increases the risk of morbidity and mortality and cognitive and physical developmental delays. Brain development, such as the number of brain cells and their interconnectedness occurs during the first years of life. Prevention of malnutrition and anemia is essential to improving early childhood development and thus affecting, overall health, education and earning potential (Young, 2002). Some studies have estimated that GDP losses are 2-3 percent per year and that years of schooling decreases by 0.7 grades for children that are stunted, which could result in approximately 12% reduction in lifetime earnings (Grember et.al. 2010). There is also a double edge sword of malnutrition, where shorter individuals have a higher risk of obesity and chronic diseases, such as diabetes. These illnesses have a detrimental impact on earnings, but also have high medical costs; Black et. al. (2008) have estimated that 11% of the total global disease burden is a result of malnutrition.

Decreasing the number of malnourished children also implies addressing the nutritional status of women of reproductive age and during pregnancy. Women less than 145 centimeters in height are at risk for complications during pregnancy; in Asia 10% of women are shorter than 145cm. Women also could have low social status in households meaning that they are often the last in the house to eat and thus may not receive the necessary nutrients they need to have a baby born of healthy size and weight (Grember et. al 2010).

Studies have shown that the most effective method is to prevent malnutrition is to promote programs that target women of reproductive age, pregnant women, and children less than 24 months of age, instead of identifying children that are malnourished or when a child is older than 24 months. The gains achieved in a child's vertical growth (Schroeder et al. 1995) and adult earnings (Hoddinott et al. 2008) via nutrition interventions declined significantly with a child's age. Even more telling, the benefits achieved via the nutrition intervention were greater for children exposed to the intervention less than two years of age than those older than two years of age; no benefits were found among children exposed older than three years of age. Therefore, intervening before a child turns two years of age is essential. Even more important is to ensure that women have adequate nutrition during pregnancy.

A window of opportunity exists to prevent malnutrition and thus increase a child's cognitive development and longtime expected earning potential. This period is often termed the first 1,000 days of a child's life, from the time of conception until the child is 24 months of age.

III. Conceptual Framework

The PM2A program discussed in this paper is being conducted in Alta Verapaz, Guatemala. Guatemala has the third highest rate of chronic malnutrition in children in the world. The prevalence of stunting in children between 3 and 59 months of age in Guatemala is 49.8% with 21.2% being severely stunted ($HAZ < -3SD$). The prevalence of stunting has dropped a mere 5.4 percentage points from 1995 to 2008 (ENSMI, Encuesta Nacional de Salud Materno Infantil 2009). The prevalence of stunting is highest in rural areas (58.6%), among the indigenous population (65.9%) and in children of mothers

without education (69.3%). As in all of Latin America, wasting (weight-for-height Z-score (WHZ) <-2) is uncommon, with a prevalence below 2% (ENSMI, 2009). Alta Verapaz has some of the highest rates of stunting (59.4% of children three to 59 months of age as compared to 49.8% nationally) (ENSMI, 2009). The majority ethnic group in the PM2A program areas is Q'eqchi'. Mercy Corps started implementation in four of the sixteen Alta Verapaz municipalities (Cahabón, Cobán, Lanquín, and San Pedro Carchá) in 2010.

The primary objectives of the PM2A program are to improve the health and nutritional status of pregnant and lactating women and children under two years of age and to strengthen the quality and delivery of health care services. To accomplish this, the PM2A program has three interrelated components. First, the program distributes food rations including family and/or individual rations. The family ration is provided in order to increase household food security and to prevent the sharing of the individual ration. The individual ration directly targets pregnant or lactating women and/or children 6-23 months of age and aims at increasing their energy, protein, and micronutrient intake. The reasons for providing the individual ration are the inadequate diet of pregnant and lactating women and children 6 to 23 months of age (Olney, 2011), the high prevalence of micronutrient deficiencies and high levels of child stunting. Second, all program beneficiaries are required to participate in behavior change communication sessions (BCC) that focus on improving key health and nutrition-related behaviors. The objective of the BCC sessions is to improve women's health and nutrition related knowledge and practices. The final component is the strengthening of preventive health services for pregnant and lactating women and children under five and required attendance by

beneficiaries and their children < 2 years of age at these services. The third PM2A component –strengthening preventive health services and increasing health care utilization- corresponds to the need to improve the training of the health staff and more specifically the community facilitators, midwives, and the community health workers.

The food distributions and BCC sessions are organized monthly at the convergence centers (CCs, centros de convergencia), which CCs are part of the Extension of Coverage Program (PEC, Programa de Extension de Cobertura) aimed to expand health coverage to rural populations and to provide basic health services (SBS, Servicios Básicos de Salud) to pregnant and lactating women and children less than five years of age. Women can enroll in PM2A at any stage during pregnancy or lactation if the lactating woman has a child under 6 months of age, or enroll their child between the ages of 6 and 18 months.

The PM2A program incorporates a research program being undertaken by the International Food Policy Research Institute (IFPRI) in collaboration with Mercy Corps, and with funding from USAID through the Food and Nutrition Technical Assistance II (FANTA-2), FANTA-2 Bridge and FANTA-3 projects. FANTA also provided technical input and oversight for the implementation and evaluation of PM2A program. For the purposes of the IFPRI-led research on PM2A and more specifically to answer questions related to the optimal size of the family food ration and the composition of the individual food ration, the study compares households in CCs that have been randomly assigned to one of six study groups (Tables 1 and 2):

- Group A: Full family ration (rice, beans and oil), individual ration (Corn soy blend (CSB)), BCC and required health visits.
- Group B: Reduced family ration (rice, beans, and oil), individual ration (CSB), BCC, and required health visits.

- Group C: No family ration, individual ration (CSB), BCC, and required health visits.
- Group D: Full family ration (rice, beans, and oil), lipid-based nutrient supplement (LNS) as the individual ration, BCC, and required health visits.
- Group E: Full family ration (rice, beans, and oil), micronutrient powder (MNP) supplement as the individual ration, BCC, and required health visits
- Group F: Control group: this group does not receive *PM2A* (i.e. does not receive family or individual rations, or BCC messages) and is not required to attend health visits. Families in the control group, however, have access to the standard MoH health services.

The full family ration of rice, pinto beans, and vegetable oil provides an average of 269 kcal per household member per day (Table 1) and is given to all beneficiary families in study groups A, D, and E. Group B receives a reduced family ration (approximately 152 kcal per day per family member) and group C does not receive a family ration. The individual ration is intended to be consumed strictly by the targeted individual; in study groups A, B and C it consists of CSB. The ration provides 494 kcal per day (Table 1). In two of the study groups (D and E), micronutrient supplements are provided instead of CSB: LNS in group D and MNP in group E (Table 1).

IV. Study design

A cluster randomized controlled evaluation design was used to evaluate the *PM2A* program. A cluster was defined as a group of communities served by one CC. One CC serves, on average, 900 to 1,000 people living in two to three communities. A total of 120 CCs were selected out of the pool of 221 *PM2A* eligible CCs in the municipalities of Cahabón, Cobán, Lanquín, and San Pedro Carchá in Alta Verapaz. The CCs were randomly assigned to one of the six study groups (20 CCs per group). The impact evaluation is being evaluated via a longitudinal survey. The first round of the survey enrolls pregnant women between three and seven months pregnant. Follow up surveys

track the nutritional status of the mother-child pair when the child is one, four, six, nine, twelve, eighteen, and twenty-four months of age.

The first round of the longitudinal survey enrolled 4,548 pregnant women across the six research arms between August 2011 and December 2012. All women who were three to seven months pregnant that resided in communities served by the 120 selected CCs were invited to enroll in the study. A master list of eligible women was compiled using information obtained from the NGOs that manage the CC's health services and from a list of PM2A's beneficiaries, before the start of field operations in August 2011. If there was more than one eligible pregnant woman in the household, one woman was randomly selected by ranking the women's first names alphabetically. If another woman became pregnant in the same household at a later date, she was not eligible to enroll in the study cohort.

V. Descriptive Statistics

In this section we discuss characteristics of the household, the pregnant women and PM2A program participation.

The pregnant women's households were on average 6.3 members with about half of the members younger than 18 years of age (Table 3). The majority of household heads were male (94.0%); they were on average 39.6 years of age. Almost all household heads (99.6%) self-identified as being indigenous and less than half reported speaking Spanish (44.9%). A large majority of household heads had no levels of education: 45.9% did not attend school. Household heads primarily worked in agriculture, either farming their own land or their family lands (56.9%) or as hired agricultural laborer (22.6%). Less than a

quarter of households lived in houses with electricity and the majority of houses had dirt floors.

On average pregnant women in the sample were married, about 25 years of age and between 22 and 23 weeks pregnant (Table 4). The majority of pregnant women self-reported to being the household head's partner (62.3%), while 22.2% were the head's daughter-in-law and 12.8% his daughter. Pregnant women's education level was somewhat higher than the household head, but nevertheless low: about one-third had received no formal education and 42.0% did not finish primary school. Nearly all pregnant women considered themselves indigenous and less than one-quarter reported speaking Spanish. Close to 90% of the pregnant women reported not having worked for pay in the past year. One out of three women was less than 145 cm tall, which is a marker for obstetrical risk.

Pregnant women were unlikely to own high-value assets (such as land, a house, jewelry and livestock) they could sell (Table 5). Land or houses were owned by 1% or less and jewelry and livestock by between 5 and 10% of the women. A somewhat larger proportion of women (16.3%) mentioned that they had money they could spend autonomously. Less than a third of pregnant women stated that they solely could make the decision to work or use birth control.

Between 28.0 and 36.1% of pregnant women reported participating in the PM2A program, with the highest participation rates found in arms A and D (Table 6). Surprisingly few pregnant women reported to be a PM2A program beneficiary at the time of the enrollment survey. Even though the proportion of pregnant women enrolled in PM2A increased with gestational age, it was still only about 39% in women in the third

trimester of pregnancy. The low enrollment rate during pregnancy might limit the potential impact of the program on maternal and child outcomes. Finally, enrollment appears to be higher in arms A and D.

The main reasons given for non-participation were that women did not want to comply with required program duties (25.9%) or that they lacked the necessary information (13.0%). Around 5% of the non-participating pregnant women mentioned that the voluntary contribution¹ was too high or that they did not want to participate in the BCC sessions.

VI. Econometric Model

The decision to participate in the PM2A program is based on the perceived expected benefits and costs of participation. A pregnant woman will participate if the expected benefits outweigh the costs. We can define a dichotomous migration variable, P_i , which takes on the value of 1 if pregnant women is a beneficiary of the program at the time of the interview and 0 otherwise. The probability of being a beneficiary, then, is

$$\Pr[P_i = 1 | x_i', \beta] = \Lambda(X_i \beta) \quad (6)$$

where $\Lambda(\cdot)$ is the logistic cdf, $\Lambda(z) = e^z / (1 + e^z)$. Other distributions may be assumed. The vector β contains parameters representing the effects of the observed explanatory variables, X_i . We estimate the probability of participation of pregnant women in the PM2A program as a function of the women's socio-demographic characteristics, benefits received by the program, the costs associated with program

¹ To receive the monthly food rations, beneficiaries must first attend a PM2A BCC session and provide a voluntary monetary contribution. The voluntary contribution amount provided by each beneficiary was determined jointly by health commission members and beneficiaries and may vary by treatment arm since each CC determined an amount that would be a fair exchange for the rations received.

participation, and the women's status and decision-making power in the household. Table 7 presents the summary statistics of the dependent variable and the independent variables used in the analysis.

Socio-demographic characteristics include the women's age, marital status, ability to speak Spanish, and education level (Table 7). Proxies are also included to indicate the household's wealth; if the household has a non-dirt floor or electricity in the household. Benefits are captured as a dummy variable which indicates the research group of the rural health center that services her community. We hypothesize that women in health centers that receive a full food ration should perceive higher benefits than those at health centers with the reduced family ration or no family ration. A pregnant woman should also perceive a higher benefit from receiving the CSB individual ration than the LNS and MNP supplements; beneficiary knowledge of the LNS and MNP supplements is low as these supplements had never been distributed in Alta Verapaz, Guatemala.

Costs of participation are captured by the number of children under the age of two in her household, the number of months pregnant the woman is, and if she lives in the community where the PM2A distribution is located. We also include an interaction variable between the number of pregnancy months and if the women lives in the community where the PM2A distribution occurs, as women who are further along in their pregnancy may have a harder time attending program activities. Finally, we include a set of variables that control for a women's role in the household; 1) control over money, 2) ability to make reproductive decisions, and 3) ability to decide to work or not.

VII. Results

Table 8 presents the results of the logistic regression to examine the determinants of PM2A program participation amongst pregnant women in the sample.

The first set of independent variables examines the probability of PM2A program participation as a function of the pregnant women's socio-demographic characteristics. The probability of a pregnant women's participation in the program significantly increases at a decreasing rate with her age. Probability of participation also increases with the number of weeks of pregnancy; for each additional week of pregnancy the likelihood to be a PM2A program beneficiary increases by 4.8%. Being married and being married to the household head also increases the probability of program participation. A pregnant woman that is married is 3.9 times more likely to be a beneficiary than a non-married pregnant women; while if the pregnant women is the spouse of the household head she is 1.3 times more likely to be a beneficiary than a pregnant women that is the child or other type of familial relation with the household head. Surprisingly there is no significant effect on the women's ability to speak Spanish or educational level on her probability to be a PM2A program beneficiary.

The second set of independent variables is housing and household characteristics. Living in a house with electricity and non-dirt floor decreases the likelihood to be a beneficiary. If the house has electricity pregnant women are 22% significantly less likely to be a program beneficiary. Furthermore, there is a large and significant affect in the number of children less than 24 months of age living in the household. For each additional child under the age of 24 months, a pregnant woman is three times more likely to be a PM2A beneficiary.

The third set of independent variables identifies the benefits of participation in the program, such as the type of family and individual rations the beneficiary receives, and the costs to participation, location of the PM2A distribution site. The location of the PM2A distribution site has no significant effect on the likelihood of participation. However, there are some surprising results with respect to the likelihood of participating with respect to the research arm in which the women is enrolled. In comparison to research arm A, full family ration plus CSB, there is no significant effect on program participation. The odds ratio for arms that provide a reduced or no family ration or provide MNPs as the individual ration are less than one. The odds ratio is only greater than one, although insignificant, in the research arm where the beneficiary receives the full family ration and LNS as the individual ration.

The final set of independent variables characterizes the women's decision making power in the household. The decision to work or to use of birth control can be made by the pregnant women, joint between the women and her partner, her partner alone, or by another person. For both decisions, there is no significant effect if it is made either by her partner or jointly with her partner the women in relation to the decision made by her alone. However, if the decisions are made by another person in the household, i.e. mother-in-law, the women is less likely to participate in comparison to the decision made solely by the pregnant women. For decisions over her right to work, the likelihood that a pregnant woman is a PM2A beneficiary significantly decreases by 44% if another individual makes the decision in comparison to the decision made by herself.

VIII. Conclusions

Understanding the determinants of participation in nutrition interventions is a critical step towards decreasing chronic malnutrition and the first step in ensuring that all children reach their cognitive and economic development potential.

This paper provides many points of discussion. For instance, what are the main determinants of participation in a program aiming to prevent undernutrition? Does the amount of food that a pregnant woman receives or her previous knowledge of the food commodities affect her participation? Does a woman's role in the household and her decision making power affect her participation? If so, how should programs alter outreach activities to potential participants and increase the participation of those that are less likely to join?

The paper addresses the first question, what are the main determinants of participation in a program aiming to prevent undernutrition? The logistic regression finds that the older women that are married to the household head are more likely to participate. Furthermore, the farther along the women is in her pregnancy the more likely she is to be a PM2A program beneficiary. Surprisingly the ability to speak Spanish and education level has no influence. This result could be a function of the PM2A program's work in hiring fieldworkers that speak the local language and to provide program materials that have minimal written words. Furthermore, richer households, proxied by having a household with electricity and non-dirt floor are less likely to participate, perhaps indicate that the households do not need the food provided by the program.

The logistic regression provides support that the amount of food that a pregnant woman receives, either as a family food ration or as an individual ratio, potentially has an impact on the likelihood of program participation, but the effect was not large or significant. From the descriptive statistics there are more program beneficiaries in the research arms that provide a full family ration with either CSB or LNS as the individual ration. It appears that these food packages provide a slight incentive for women to participate, but it is minimal.

However, a woman's role in the household and her decision making power do have a significant effect on the likelihood of being a PM2A program beneficiary. Women that are married are more likely to participate and women that are the spouses of the household head are also more likely to participate. Therefore, women that are single or are the children or daughter-in-law of the household head are less likely to be PM2A program beneficiaries, and are more likely to not have a high status in the household. Furthermore, if the important life decisions, such as the ability to work, must be made by another person in the household, not herself or her partner, she is less likely to participate. This result indicates that household status and decision making power are an important determinant to being a PM2A program beneficiary.

The results provide insights in how to address the final question posed in this paper; how should programs alter outreach activities to potential participants and increase the participation of those that are less likely to join? First, since pregnant women are more likely to join at later stages of pregnancy, programs should identify what are the barriers to entry for women at the early stages of pregnancy. In the highlands of Guatemala, there is qualitative evidence to support that women are embarrassed to reveal

that they are pregnant. These are cultural norms that will be hard for a program to overcome, but potentially develop a recruitment plan that addresses these barriers. Another approach is to extend PM2A programs to include women of reproductive age, regardless of pregnancy status, thus ensuring that women are enrolled when they do become pregnant. In order to do this program implementers may have to develop specific BCC materials for this period of life. Second, the women's status in the household is an important determinant to program participation, thus marketing strategies must reach the decision makers in the household. PM2A program implementers must develop marketing tools that explain the benefits of the program beyond the community leaders, health center staff and pregnant women. Propaganda materials must target household heads and leaders of the community, such as midwives, traditional medical doctors, or other important individuals in the community. Explaining the importance of program participation, may increase women's participation. Finally, for some women decisions on PM2A participation may be made by other household members, such as mothers or mothers-in-law. In development of propaganda materials, program implementers must also understand this complex balance in the household and explain the benefits of participation to all household members, not just the household heads.

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Table 1: PM2A family ration sizes

Foods	Full family food ration (Groups A, D and E)		Reduced family food ration (Group B)	
	Weight	Energy	Weight	Energy
	(kg)	(kcal)	(kg)	(kcal)
Rice	6.00	21,600	3.00	10,800
Pinto beans	4.00	13,600	3.00	10,200
Vegetable oil	1.85	16,354	0.925	8,177
Total	11.85	51,554	6.925	29,177
Total kcal/capita/day ^a		269^b		152^c

^aTotal kcal/day/capita is calculated using an average household size of 6.3 members (the average household size in the enrollment survey, see Table 4.1) and 30.42 days/month.

^bNote that the individual ration is not meant to be shared, so we do not include it in the computation of the total energy/capita/day. If the CSB was shared, it would provide an additional 78 kcal/day/capita, and the total full family food ration would therefore provide 347 kcal/day/capita and the reduced family food ration would provide 231 kcal/day/capita.

Table 2: Monthly individual ration size of PM2A^a

Target group	Individual Ration							
	CSB (Groups A, B, and C)		LNS (Group D)			MNP (Group E)		
	<i>Kg/mont</i> <i>h</i>	<i>kcal/day</i>	<i>Sachets/</i> <i>month</i>	<i>g/day</i>	<i>kcal/da</i> <i>y</i>	<i>Sachets</i> <i>/month</i>	<i>g/day</i> <i>kcal/da</i> <i>y</i>	
Pregnant/lactating women	4.0	494	30	20	118	60	4	-
Child aged 6-23 months	4.0	494	60	20	118	60	4	-

^aNote that all groups receive PM2A BCC + health services except the control group, which will have access to the standard MoH health services.

Table 3: Demographic characteristics of the household and household head

	Full sample ¹	Study arm ¹					
		A	B	C	D	E	F
N	4548	748	755	757	740	795	753
<i>Household</i>							
Household size	6.3±3.0	6.4±3.0	6.2±3.0	6.3±3.0	6.5±3.0	6.1±3.0	6.2±2.9
Percent adults: (members ≥18years/household size) x 100)	54.4±19.7	54.2±19.8	53.8±19.8	54.9±19.8	54.1±19.3	55.4±19.9	53.8±19.4
<i>Household head</i>							
Age of household head (years)	39.6±13.9	39.9±14.3	39.1±13.3	40.7±14.6	40.1±13.6	38.7±13.2	39.3±14.0
Gender of household head (% male)	94.0	94.1	95.2	95.2	92.8	91.9	94.4
Indigenous (%)	99.6	99.6	99.5	99.2	99.6	99.7	99.7
Speaks Spanish (%)	44.9	42.5	41.5	46.1	51.8	45.0	42.9
No Education	45.9	51.3	47.5	43.9	38.9	48.6	45.3
Farms own or family land	56.9	55.9	60.3	57.1	53.0	61.0	53.5
Agriculture laborer	22.6	23.9	19.3	22.1	22.2	19.6	28.7
Electricity; % yes	24.6	22.1	26.0	28.4	29.6	26.7	15.1
Have dirt floor	82.5	89.4*	82.1	78.2	79.1	80.9	85.4

¹ Values are mean±SD or %;

* Study arms differ, p-value <0.05.

Table 4: Pregnant women characteristics and activities

	Full sample ¹	Study arms ¹					
		A	B	C	D	E	F
N ²	4548	748	755	757	740	795	753
Age (years)	24.8±6.6	24.8±6.7	24.6±6.5	24.5±6.5	24.9±6.4	24.9±6.7	25.1±6.7
Has a spouse or partner	96.0	96.1	97.2	95.2	94.5	97.0	96.0
Number of weeks pregnant according to self-reported last period date	22.5±5.7	22.9±5.5*	22.3±5.6	22.6±5.9	23.1±5.8	22.4±5.7	21.9±5.9
<i>Relationship to household head</i>							
Spouse	62.3	62.7	62.6	59.0	59.5	65.4	64.1
Child	12.8	13.2	13.2	14.3	12.8	11.4	12.0
Daughter-in-law	22.2	21.8	20.9	24.8	24.1	20.1	21.4
Other	2.7	2.3	3.2	1.9	3.6	3.0	2.6
<i>Education</i>							
None	33.4	36.6	36.2	32.6	27.6	35.1	32.3
Preschool	0.8	0.8	0.7	0.5	0.8	0.9	1.1
Primary incomplete	42.0	41.4	38.7	43.2	45.7	39.8	43.5
Primary complete	16.6	14.0	18.0	16.8	17.3	17.5	15.7
(Some) junior high	6.1	6.6	5.8	5.2	6.8	5.8	6.6
(Some) senior high	1.0	0.4	0.5	1.7	1.8	0.8	0.8
University	0.1	0.1	0.0	0.0	0.1	0.1	0.0
Speaks Spanish	24.4	22.3	24.3	25.2	32.6	21.8	20.3
No employment in last 12 months	88.4	90.4	89.3	89.0	84.7	89.3	87.8
% less than 145 cm	33.9	35.3	30.5	34.2	35.1	33.1	35.6

¹ Values are mean±SD or %.

* Study arms differ, p-value <0.05.

Table 5: Ownership and control of assets

	Full sample¹	Study arms¹					
		A	B	C	D	E	F
N	4548	748	755	757	740	795	753
<i>Pregnant women assets; % who own and can sell</i>							
Land/farm/fields	1.1	0.9	0.4	0.9	1.9	1.1	1.2
Primary residence	0.2	0.0	0.0	0.1	0.0	0.8	0.3
Secondary residence	0.1	0.3	0.0	0.0	0.1	0.0	0.0
Jewelry/stones	8.6	9.1	8.2	7.0	10.3	7.9	9.4
Livestock	5.5	6.1	6.1	4.9	5.7	5.0	5.0
Has own money to spend autonomously; % yes	16.3	13.0	15.0	16.6	18.8	16.5	17.8
Decision to work, mother alone	30.7	32.7	32.5	32.8	36.4	30.4	32.8
Decision to use birth control, mother alone	27.5	29.8	25.9	26.9	28.7	24.5	29.2

¹ Values are %.

Table 6: PM2A program participation

	Full sample ¹	Study arms ¹					
		A	B	C	D	E	F
N	4548	748	755	757	740	795	753
<i>Participation in PM2A</i>							
All women	26.6	35.4*	31.5	28.0	36.1	28.1	0.4
2 nd Trimester	24.8	32.7*	30.6	26.4	33.9	25.8	0.3
3 rd Trimester	33.3	44.0*	34.9	34.1	43.6	36.7	0.7
<i>Reasons for not participating</i>							
Voluntary contribution too high	5.4	5.6*	7.7	4.0	5.9	10.8	0.1
Do not need the food rations	3.3	5.2*	4.6	3.5	4.2	4.0	0.0
Do not want to go to BCC sessions	6.3	5.8*	9.5	6.4	8.3	9.4	0.7
Do not want to fulfill other duties	19.9	25.9*	26.1	23.3	26.3	24.8	1.5
PM2A not in community	22.7	3.3*	2.7	5.7	4.0	3.3	88.0
Lack of information, not familiar with program	13.8	13.0*	12.4	21.1	15.7	14.5	8.3
Graduated or dropped out	4.1	4.8*	6.6	4.2	7.2	4.0	0.1
Other	19.1	22.9*	21.5	22.7	20.0	25.9	1.5
Reason unknown	2.4	3.9*	4.4	2.6	3.0	1.6	0.3

¹ Values are mean±SD or %.

* Study arms differ, p-value <0.05.

Table 7: Dependent and independent variable

Variable	N	Mean	Std. Dev.	Min	Max
Dependent Variable					
Participation in PM2A	3793	0.32	0.47	0	1
Independent Variables					
<i>Pregnant Women (PW) characteristics</i>					
Pregnant Women's (PW) Age (in years)	3793	24.76	6.55	12	47
PW'S Age Squared (in years)	3793	656.07	352.57	144	2209
Number of weeks pregnant	3778	22.65	5.71	0	43.29
PW speaks Spanish	3792	0.25	0.43	0	1
PW is married	3793	0.96	0.20	0	1
PW completed primary school	3793	0.66	0.48	0	1
PW is spouse of household head	3793	0.62	0.49	0	1
<i>House characteristics</i>					
Household has non-dirt floor	3793	0.18	0.38	0	1
Household has electricity	3793	0.27	0.44	0	1
Number of children less than 24 months of age	3793	0.26	0.48	0	3
<i>Decision making characteristics</i>					
Decision to work					
Joint with partner	3793	0.20	0.40	0	1
Partner alone	3793	0.43	0.50	0	1
Other person	3793	0.04	0.19	0	1
Decision to use birth control					
Joint with partner	3793	0.46	0.50	0	1
Partner alone	3793	0.24	0.43	0	1
Other person	3793	0.03	0.16	0	1
Control over money	3792	0.16	0.37	0	1
<i>Research Arm</i>					
Reduced ration + CSB	3793	0.20	0.40	0	1
No ration + CSB	3793	0.20	0.40	0	1
Full ration + LNS	3793	0.19	0.40	0	1
Full ration + MNP	3793	0.21	0.41	0	1
Community is a PM2A distribution site	3793	0.70	0.46	0	1

Table 8: Determinants of PM2A participation among pregnant women (odds ratio)^a

	1	2	3	4	5
Sample Size	3777	3777	3777	3777	3776
<i>Pregnant Women (PW) characteristics</i>					
PW age	1.127** (2.65)	1.150** (3.09)	1.147** (3.02)	1.147** (3.03)	1.142** (2.92)
PW age squared	0.998** (-3.00)	0.997** (-3.25)	0.997** (-3.20)	0.997** (-3.20)	0.997** (-3.12)
PW weeks pregnant	1.048*** (6.82)	1.043*** (5.67)	1.042*** (5.75)	1.052*** (4.20)	1.050*** (4.10)
PW speaks Spanish	0.856 (-1.72)	0.925 (-0.81)	0.902 (-1.09)	0.902 (-1.09)	0.900 (-1.10)
PW married	3.887*** (4.71)	3.427*** (4.06)	3.506*** (4.08)	3.502*** (4.07)	2.828** (3.23)
PW finished primary	0.997 (-0.04)	1.099 (1.04)	1.085 (0.89)	1.084 (0.88)	1.083 (0.87)
PW married to hh head	1.343** (3.29)	1.432*** (3.81)	1.455*** (3.94)	1.457*** (3.95)	1.441*** (3.84)
<i>House characteristics</i>					
Non-dirt floor (% have)		0.873 (-1.17)	0.886 (-1.05)	0.884 (-1.07)	0.877 (-1.13)
Electricity (% have)		0.785* (-2.45)	0.784* (-2.29)	0.785* (-2.28)	0.781* (-2.31)
Number of children<24 months		3.072*** (14.62)	3.095*** (14.62)	3.094*** (14.60)	3.113*** (14.57)
<i>Research Arm</i>					
Community is a PM2A distribution site			1.015 (0.13)	1.383 (0.94)	1.363 (0.90)
Research Arm					
Reduced ration + CSB			0.898 (-0.59)	0.897 (-0.59)	0.896 (-0.59)
No ration + CSB			0.744 (-1.48)	0.747 (-1.46)	0.744 (-1.47)
Full ration + LNS			1.138 (0.68)	1.138 (0.68)	1.130 (0.64)
Full ration + MNP			0.728 (-1.84)	0.731 (-1.82)	0.736 (-1.76)
Number of weeks pregnant*community				0.987	0.987

	1	2	3	4	5
Sample Size	3777	3777	3777	3777	3776
				(-0.92)	(-0.87)
<i>Decision making characteristics</i>					
Decision to work					
Joint with partner					1.088
					(0.80)
Partner alone					0.905
					(-1.06)
Other person					0.559*
					(-2.12)
Decision to use birth control					
Joint with partner					1.054
					(0.49)
Partner alone					1.004
					(0.03)
Other person					0.862
					(-0.51)
Control over money					1.068
					(0.63)

* p<0.05

** p<0.01

*** p<0.001

^a Odds ratios are presented in the table.