# Are Behavioral Change Interventions Needed to Make Cash Transfer Programs Work for Children? Experimental Evidence from Myanmar *

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April 24, 2020

**Abstract**

This paper evaluates a large-scale maternal cash transfer program targeted to pregnant women and mothers of children under two. The program provides monthly cash transfers, and is supplemented with Social Behavior Change Communication (SBCC) in a random subset of villages. Both interventions lead to a large reduction in the proportion of children (moderately) stunted. Meanwhile, cash alone has no detectable impact on child outcomes. The effects are accompanied by improvements in dietary diversity, breastfeeding, hand-washing practices, prenatal care and food consumption. These results provide strong support for adding SBCC to maternal cash transfer programs in order to realize their impact.

*Keywords*: Nutrition, Cash Transfers, Social and Behavior Change Communication

**Trial Registration:** The trial was registered on AEA RCT registry. Registration number: AEARCTR-0004189. https://www.socialscienceregistry.org/trials/4189

* *Acknowledgments:* We thank the Livelihoods and Food Security Trust Fund and the International Growth Centre for their continued support of this research. We also thank our counterparts at Save the Children for their guidance, feedback, and faith in the research process. Additionally, this project would not have been possible without the contributions of the Ministry of Social Welfare, Relief, and Resettlement; the Department of Social Welfare; the Myanmar Nurse and Midwife Association; and the Pact Global Microfinance Fund. Finally, we extend our deepest gratitude to the hardworking staff at Innovations for Poverty Action, in particular Nicholus Tint Zaw, Thein Zaw Oo, and Than Zaw Oo. *Funding:* The authors gratefully acknowledge support from the Livelihoods and Food Security Trust Fund and the International Growth Centre.

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# I. Introduction

Despite improvements over the last two decades, child malnutrition remains a global health concern, affecting more than 150 million children annually, and as one of the main contributors to under-five mortality (World Bank, 2017). In Myanmar, of the 4.4 million children under five, approximately 1.6 million (35 percent) are stunted, a critical indicator of malnutrition early in life. Levels of stunting in the country vary by geographic region, location, wealth and maternal education, reaching levels as high as 50 percent (United Nation Standing Committee on Nutrition, 2010) in rural areas and in the poorest states (Demographic Health Surveys, 2015).

The provision of adequate nutrition in early life is believed to be crucial to realizing an individual's full physical and cognitive potential throughout the life course. Evidence from both medical and social science research has contributed to the consensus that the in-utero phase and the first years of life are the most critical period for determining future health outcomes (Almond and Currie, 2011a). Inadequate nutrition during the first 1000 days of life is believed to produce higher susceptibility to illness, poor physical status, and impaired physical and cognitive ability later in life (Almond and Currie, 2011b; Doyle, 2019). This has the potential to result in lower human capital accumulation, productivity, and earnings in adult life, contributing to the inter-generational transmission of poverty (Engle et al., 2007; Hoddinott et al., 2013; Richter et al., 2017).

In this study we present results from an evaluation of an intervention designed to reduce chronic malnutrition during the first 1000 days of life by providing cash transfers with and without Social Behavior Change Communication (SBCC) to women who are pregnant or have children under two years old. Over the last few decades, maternal cash transfers have become an important tool used by governments, NGOs, and international agencies to alleviate poverty and reduce vulnerability. Several low- and middle-income countries have adopted cash transfer programs targeted to mothers of young children designed to bolster health investment in children living in poverty, and thereby disrupt the cycle of poverty (Hoddinott et al., 2017). To date, cash transfer programs reach between 750 million to one billion people globally, and have been associated with a wide range of positive outcomes, including increases in schooling and business income of vulnerable populations (Bastagli et al., 2016). Yet, there is no rigorous evidence that these programs lead to significant reductions in child malnutrition, which is their principal motivation (Manley et al., 2013). Although higher household income must be weakly better for children, there is concern that parental knowledge barriers reduce the marginal impact of income on child health, or that household members responsible for producing child health do not have sufficient control over household income to ensure that transfers go towards child health investments.

An alternative strategy for promoting child health that has been implemented in a num-

ber of different settings either as stand-alone programs or in conjunction with maternal cash transfers, is maternal SBCC. These programs focus on infant and child health and feeding practices, and are designed fundamentally to reduce knowledge barriers to child health production. A number of studies have evaluated child health impacts of maternal SBCC programs (Luo et al., 2012; Zulfiqar A Bhutta et al., 2013), but evidence on their efficacy is inconclusive and limited to behavior change rather than child outcomes. In particular, several evaluations show that transfer programs can lead to improved infant and child feeding practices if they are combined with SBCC (Fiszbein et al., 2009; Avula et al., 2013; Hoddinott et al., 2017), but fail to measure impacts on health outcomes of children. Moreover, a recent randomized experiment in Nepal found meaningful effects of supplementing cash transfers to young mothers with SBCC on health knowledge and behavior, but null effects on child malnutrition (Levere et al., 2016).

These results raise concern that even when SBCC programs are successful in promoting behavior change, the changes they induce are insufficient to reduce malnutrition in children, either because the behaviors themselves are not tightly linked to child malnutrition, because those on the margin of behavior change are not the most susceptible to malnutrition, or because self-reported measures of maternal health behaviors are subject to biases that exaggerate the impacts of SBCC. As a result, the efficacy of SBCC programs – either alone or in conjunction with maternal cash transfers – in bolstering child health remains uncertain.[1]

This paper sheds light on the efficacy of cash alone and cash enhanced with SBCC for reducing child malnutrition. The interventions we evaluate were implemented as part of a pilot of a national maternal transfer program sponsored by the Government of Myanmar and implemented by Save the Children International (SCI) in 437 rural villages spread across three townships in the Dry Zone.[2] Over 30 months, the program was delivered to all women in intervention villages who were pregnant or had children under two years old. Enrollees were provided monthly transfers from enrollment until their child reached two years of age, or for 24-30 months. In a randomly chosen subset of treatment villages, program recipients also received monthly SBCC group sessions that covered a range of topics relevant to child health and nutrition.

We assess the impact after 30 months of implementation of transfers alone and in combination with SBCC on child height-for-age Z-scores (HAZ scores), a well-validated biometric measure of chronic malnutrition in children (Leroy and Frongillo, 2019). Low HAZ scores in children over the age of two indicate stunting, an irreversible condition that permanently

[1] Carneiro et al. (2019) conduct a field experiment to evaluate a composite intervention that combines cash transfers and SBCC to mothers in Nigeria, and find positive effects on child biomarkers. However, their study does not isolate the effect of cash transfers alone, so cannot shed light on the marginal contribution of SBCC to cash transfer programs.

[2] The name of the program was LEGACY, which stands for "Learning, Evidence Generation, and Advocacy for Catalyzing Policy".

hinders physical and cognitive growth. Our analysis focuses on women who were found to be pregnant at the time of enrollment and prior to program announcement, which circumvents concern over selective fertility or migration into treatment villages. Our results indicate that the combination of cash transfers and SBCC leads to a 4.6 percentage point (13.5%) statistically significant reduction in the proportion of children who are stunted. The effects are concentrated among moderate but not severe stunting. Meanwhile, cash alone has no detectable impact on child biomarkers relative to the control group.

We also explore the mechanisms through which cash transfers and SBCC affected chronic malnutrition using survey data on health behaviors collected at endline. Our results indicate that the reduction in stunting is driven by a combination of behavioral pathways, including improvements in dietary diversity, breastfeeding and hand washing practices, prenatal care, and food consumption. Cash transfers alone improve prenatal care and food consumption but to a lesser extent, and have no measurable impact on dietary diversity, breastfeeding, and hand washing practices.

These findings provide novel evidence on the importance of combining maternal cash transfers with behavioral change interventions in order to maximize their impact on child health, and offer a fundamental lesson for the design and implementation of maternal cash transfer programs in other low-income countries.

# II. Methods

## II.A. Program Design

The LEGACY program was implemented between 2016 and 2019 in three townships of Myanmar's Dry Zone (Pakkoku, Yesagyo, and Mahlaing). It comprised two separate interventions: 1) monthly cash transfers to new mothers beginning in pregnancy until their children turned two years old; and 2) monthly cash transfers supplemented with monthly SBCC that covered a range of topics relevant to child health and nutrition.

Both interventions were randomized across 102 sub-rural health care center catchment areas (the geographic unit of randomization) located within two hours of an urban center. To minimize differences across experimental arms, prior to random assignment, catchment areas were first grouped into 34 triplets (strata) based on geographic clustering. Within each stratum, individual catchment areas were randomly assigned to one of three experimental arms: (1) Treatment 1 (T1 – Cash+SBCC), in which cash transfers and SBCC activities were provided jointly (N = 34 catchment areas, encompassing 142 villages); (2) Treatment 2 (T2 – Cash-only), in which only cash transfers were provided (N= 34 catchment areas, encompassing 146 villages); and (3) Control, in which neither cash transfers nor SBCC were offered (N = 34 catchment areas, encompassing 149 villages) (Appendix Fig 1).

Within both T1 and T2 catchment areas, all pregnant women were assigned to receive monthly cash transfers worth 10,000 MMK (6.5 USD) beginning in their second trimester of pregnancy until their newborn child reached two years of age.[3] In addition to monthly cash transfers, beneficiaries in T1 were targeted with SBCC in the form of monthly information sessions on four main topics: infant and young child feeding (IYCF) practices, health-seeking behavior, hygiene practices, and household expenditures.

The program was implemented by SCI in collaboration with the Myanmar Nurse and Midwives Association (MNMA), a national non-governmental organization that provides prevention and community-based care, and Pact Global Microfinance (PGMF), a nonprofit international development organization that delivers microfinance in rural areas. PGMF managed monthly cash disbursements by creating an ad-hoc bank account for each program beneficiary into which transfers were deposited on a monthly basis and delivered through PGMF's network of rural loan agents. MNMA was responsible for coordinating the sensitization and enrollment of eligible women in each treatment village and organizing SBCC activities in villages assigned to the T1 group.

SBCC activities were implemented in two stages. First, between May 2016 and January 2017, MNMA delivered basic SBCC programming within each village aimed at mobilizing communities to address poor nutrition. Basic programming included mother-to-mother support groups (including 12-15 pregnant women or mothers of under 5 years old children) in which mothers were brought together monthly to disseminate information and share experiences with feeding practices during pregnancy, lactation, and early childhood; and a handful of participatory community-level sessions (13-15 community members) that explored perceptions and current practices around diet and nutrition, health care, and household and food expenditures. Based on the information gathered through the basic SBCC activities, SCI then designed a series of intensive SBCC sessions that focused on key behaviors and messaging across four topics: IYCF (including dietary diversity and breastfeeding), health-seeking behavior, hygiene practices, and household expenditures. These sessions were delivered both to the maternal support groups, and also through separate sessions targeted to fathers and elderly household members. The last cohort of mothers was enrolled in May 2018. The last monthly cash transfer and the last SBCC interventions were completed in November 2018 and May 2019, respectively (Appendix Fig. 2).

Administrative data indicate high participation in both the cash transfer and SBCC programs: our monitoring activities conducted in one of three townships revealed low inclusion and exclusion errors to the cash transfer programs (9.8% and 6.8%, respectively), while administrative data from SCI found that in Cash+SBCC villages 99% of enrolled mothers attended at least one SBCC session, with 18% attending four times or less, and 81% attending

[3]In October 2017 the implementer (SCI) increased the amount to 15,000 MMK (10 USD) to stay in line with similar initiatives in other parts of the country.

five times or more in a year.

## II.B. Study Population

We evaluate the program's impact on child nutrition among women who were pregnant at enrollment, the only program beneficiaries to receive the full 30 months of coverage as part of the pilot. Women in this group were identified by conducting a full listing of individuals (Appendix Fig. 2) in treatment and control study villages two months prior to the start of the program (February 2016) in which community health workers recorded every woman's age and pregnancy status. All 2,337 pregnant women identified in the listing were enrolled in the study. After 30 months we successfully tracked and administered an endline survey to 91.3% of women, resulting in a primary analysis sample of 2,134 women. The endline survey gathered data on household and individual characteristics, including weight and height data of all children under age 5, socio-economic status including income and assets, food consumption including dietary diversity, health-seeking behaviors emphasized in the SBCC sessions, credit and saving, decision-making, desired and realized fertility, and program participation.

Our analysis estimates the effects of the interventions on the 2,154 children born to these women during the study, i.e, those covered by the LEGACY program for their first 1,000 days of life. At endline, the children that benefited from the full duration of treatment are between 22 and 35 months old.[4]

## II.C. Empirical Strategy

The random assignment of interventions across villages allows us to identify the causal effect of cash transfers and the relative importance of pairing cash transfers with SBCC by comparing endline outcomes across study arms. We estimate program effects with the following ordinary least squares (OLS) model:

$$Y = \alpha + \beta * [Cash + SBCC] + \gamma * [Cash - only] + \delta X + t + \epsilon (1)$$

where $Y$ is the primary health outcome of interest. To capture nutritional impacts on children, we use child height and age data from endline to construct Height for Age z-scores (HAZ), a well-validated anthropometric measure of chronic malnutrition, using the WHO

[4]Several additional women, who were not classified as pregnant at the time of the initial listing, either because they were unaware of or reluctant to report pregnancy status early on, or because they were not found in the village at the time of the initial listing, were reclassified as eligible midway through the program. However, significantly more of such women were found in treatment relative to control villages (unsurprisingly, given their greater incentive to reveal themselves in order to receive benefits once they became aware of the program), which could bias our estimates of program effects. Hence, we restrict our evaluation of program impacts to women identified as pregnant at the onset of the study (April 2016), prior to the announcement of the program.

child growth standards (World Health Organization, 2006). A HAZ value of -1 indicates that, given sex and age, a child's height is one standard deviation below the median child in her age/sex reference group.

In addition, we construct an indicator of stunting that equals one if HAZ < -2; an indicator of severe stunting that equals one if HAZ < -3; and an indicator of moderate stunting that equals one if $-3 <= HAZ < -2$. To better understand potential pathways of influence, we examine a number of behavioral outcomes available at endline that capture economic and health determinants of malnutrition, focusing on knowledge and behaviors emphasized in the SBCC curriculum.

$Cash + SBCC$ is an indicator of whether the respondent's village was assigned to T1, and $Cash - only$ is an indicator of whether the village was assigned to T2. The excluded group is the Control Group (CG). The model also controls for a number of covariates, $X$, which include (i) individual demographic controls, including mother's age and education, and household head's age and education for the mother-level analysis; and child's sex and age, mother's age and education, and household head's age and education for the child-level analysis; and (ii) village-level controls, including distance to large and small markets, main source of livelihood (agriculture, livestock, or casual labor), availability of government provided electricity, and participation in a concurrent water, sanitation and hygiene (WASH) intervention. Village-level controls were collected prior to the start of program activity. In accordance with our randomization design, the model includes fixed effects for geographic strata (one variable for each triplet of sub-rural health catchment areas), which control for unobserved characteristics that may vary across clusters. Standard errors are clustered at the village cluster level, the unit of randomization.

To ensure that comparability across study arms was achieved by random assignment, we test for observable differences across experimental arms based on time-invariant individual characteristics (Appendix Table 1) and village-level data collected prior to the program launch (Appendix Table 2). Overall, the randomization was successful, with only 1 out of 68 comparisons unbalanced across treatment arms at a 95% confidence interval, and only 2 out of 68 unbalanced at a 90% confidence interval. We control for these unbalanced covariates in the empirical model. Although maternal cash transfers have the potential to incentivize women to become pregnant earlier than they would have otherwise or encourage migration into treatment villages, our analysis sample is limited to women who were living in the village and pregnant *prior* to learning about the program, so is not subject to concerns over endogenous selection into the sample.

# III. Results

Our main outcome of interest is stunting among children 22-35 months old. Table 1 reveals that, in control villages, a full 34% of children in this cohort are stunted, though only 7% are severely stunted.

## III.A. Program Effects on Chronic Malnutrition

Table 1 shows that children born to mothers who received both cash and SBCC (T1) from pregnancy until the child reached two years old are an estimated 4.6 percentage points (a 13.5 percent reduction, $p<0.05$) less likely to be stunted at endline (22-35 months of age) compared to children living in control households. Columns 2 and 3 reveal that this reduction in malnutrition corresponds to a change in the proportion of children moderately stunted (5.3 percentage points, a 19.6 percent reduction, $p<0.01$) but not severely stunted. Meanwhile, children in cash-only villages are not significantly less stunted than children in the control group, consistent with the hypothesis that cash transfers can effectively combat the development of chronic malnutrition only when paired with an intervention that encourages behavior change. While the estimated effects on stunting are large, the point estimates fall within the range of impacts of other interventions that have found impacts on child height.[5] Our estimates are also in line with other conditional or unconditional cash transfer programs (Biscaye et al. 2017, IEG World Bank 2011) or early stimulation and nutrition interventions (Attanasio et al., 2018).

Column 4 of Table 1 presents the treatment indicators regressed on a continuous measure of height for age, i.e., HAZ score. Although the $Cash + SBCC$ intervention arm does not have a statistically significant effect on the continuous measure, a more nuanced test of the distribution of HAZ scores shows program effects that are consistent with the stunting results. In particular, Appendix Fig. 3 reveals a rightward shift in the distribution of HAZ scores among $Cash + SBCC$ beneficiaries compared to the control group. A Kolmogorov-Smirnov non-parametric test for equality of distributions indicates that the $Cash + SBCC$ intervention has a significant positive effect on the distribution of HAZ score when compared to the Cash-only arm ($p=0.048$) and the control group ($p=0.098$). In addition, we can reject the null hypothesis of equal distributions of HAZ scores in the Cash-only arm and control group ($p=0.071$).

Consistent with these distributional patterns, columns 2 and 3 of Table 1 reveal that the

[5] For instance, a deworming intervention in Kenya increased the mean HAZ by 0.09 sd (Miguel and Kremer, 2004); an old age pension improved HAZ score of girls by 1.16 sd when received by women (Duflo, 2003). In South Africa a child support grant improved HAZ score in the 0.25-0.45 range depending on age of the children (Aguero et al., 2007). In Peru, a nutrition education intervention and the introduction of an accreditation system in health facilities improved the HAZ of children 0–18 months by about 0.272 (Penny et al. 2005, Waters et al. 2006).

program affected moderate but not severe stunting, which implies that the SBCC intervention did not succeed in combating malnutrition among the most vulnerable households. Although severe stunting is relatively low (7% on average), the absence of a program effect on this tail of the HAZ distribution is somewhat counterintuitive given that severe stunting is likely to be concentrated among the poorest households, and one would expect the same amount of cash to make a bigger difference for households in more dire circumstances.

Table 1: Child Stunting

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Prop. of children stunted | Prop. of children moderately stunted | Prop. of children severely stunted | HAZ score (WHO) |
| CASH+BCC | -0.046** | -0.053*** | 0.007 | 0.074 |
| | (0.021) | (0.018) | (0.011) | (0.047) |
| CASH | -0.004 | -0.008 | 0.004 | -0.017 |
| | (0.021) | (0.020) | (0.011) | (0.041) |
| Observations | 2151 | 2151 | 2151 | 2151 |
| Mean Control | 0.34 | 0.27 | 0.07 | -1.57 |
| Clusters | 102 | 102 | 102 | 102 |

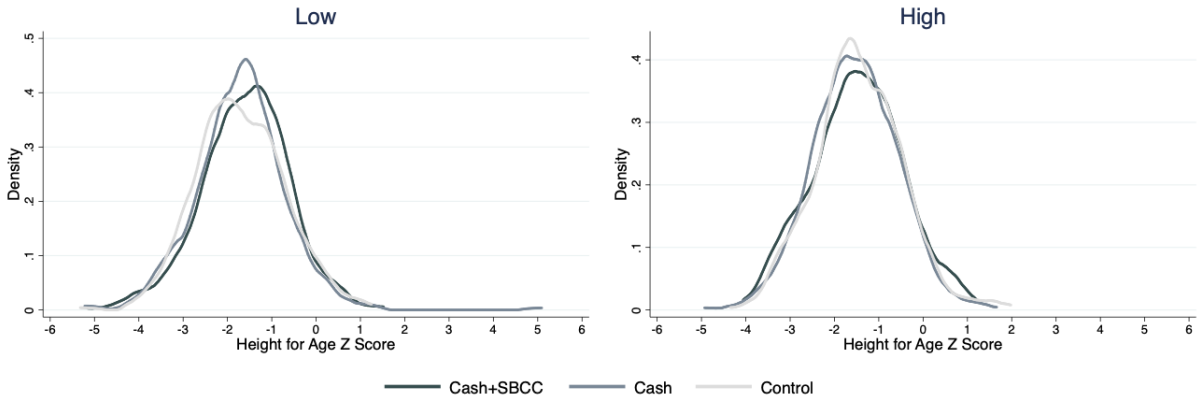
The table presents OLS estimates of the effects of the maternal cash transfer program interventions (CASH + SBCC and CASH) on measures of stunting for children whose mothers were pregnant at enrollment, following WHO classification."CASH+SBCC" indicates T1 villages, where cash transfers and SBCC activities were provided jointly; "CASH" indicates T2 villages, where only cash transfers were provided; the reference group are villages in the control group where neither cash transfers nor SBCC took place. Outcomes include the proportion of children stunted as children with Height for Age Z score (HAZ) < -2 (1); the proportion of children moderately stunted as children with HAZ < -2 and >= -3 (2); the proportion of children severely stunted as children with HAZ < -3 (3); and, HAZ (4). Controls include (i) individual demographic controls, including child's sex and age, mother's age and education, and household head's age and education; (ii) village-level controls, including distance to large and small markets, main source of livelihood (agriculture, livestock, or casual labor), availability of government provided electricity, and participation in a concurrent WASH intervention. Fixed effects per geographic strata (34) are included. Standard errors are clustered at the village cluster level. P-values from t-test from the difference in means are reported. ***p<0.01, ** p<0.05, * p<0.1.

One possible explanation is lower SBCC participation rates of extremely poor households. However, self-reported data from endline do not indicate significantly lower participation among households below median income relative to those above the median. Alternatively, the SBCC curriculum or mode of delivery may be inappropriately designed to meet the needs of very poor participants. For instance, households at risk of severe stunting may lack sufficient human capital to translate information into behavior change, or might face

additional financial barriers to implementing changes such as food diversity even with the cash transfer. Finally, households at risk of severe stunting may be concentrated in villages with poor infrastructure to support the adoption of certain health practices such as access to clean water or food products.

To further evaluate whether the absence of a program effect on severe stunting is related to differences in socio-economic status (SES), we examine patterns of treatment effects across villages according to village-level SES. In the absence of baseline data on wealth or income, we proxy for village SES with the average number of years of education attained by resident women.

It is first worth noting that rates of severe stunting are similar in magnitude across villages with low versus high average levels of parental education. This suggests that some fraction of the population may face a poverty trap such as chronic reinfection that keeps them in a state of persistent malnutrition even when village resource levels rise. Interestingly, results from the subsample analysis indicate that the program effects are concentrated in low SES villages. In particular, we observe that the distribution of the HAZ scores is strongly shifted to the right in the $Cash + SBCC$ intervention arm compared to the Cash-only arm or the control group *only* in low SES villages (Fig.1), and the difference is statistically significant. Appendix Table 3 shows a similar heterogeneous pattern in a regression framework: the results indicate that relatively low SES villages gain the most in terms of reductions in rates of stunting from maternal cash transfers combined with SBCC.




This figure describes the distribution of Height for Age Z score (HAZ) for children whose mothers were pregnant at enrollment, by treatment status, and by low vs high socio-economic status. As proxy, we use the average number of years of education attained by resident women in the village. "CASH+SBCC" indicates T1 villages, where cash transfers and SBCC activities were provided jointly; "CASH" indicates T2 villages, where cash transfers only were provided; "Control" indicates villages in the control group where neither cash transfers nor SBCC took place.

Figure 1: Child HAZ distribution by women village-level average education

Moreover, households below median income *within* the low-SES village benefit disproportionately in terms of reductions in moderate stunting relative to those above the village median (Appendix Table 4). That is, dividing the sample into four groups according to both village-level SES and household income at endline, results indicate that reductions in moderate stunting due to exposure to cash plus SBCC are fully concentrated among the quartile of households in the lower half of the income distribution within the lowest SES half of villages. Still, even among this subsample, severe stunting does not improve with either version of the program, consistent with non-convexities at low levels of income.

### III.B. Program Effects on Health Behaviors

Table 2 and Table 3 describe the program impacts on changes in knowledge and behaviors that were emphasized in the SBCC curriculum. Specifically, we focus on the following key topics covered by the education sessions: dietary diversity, breastfeeding, hand washing practices, health-seeking behavior, and food expenditures. To capture dietary diversity, we take the standard approach in the literature (based on WHO guidelines) of constructing a dietary diversity score (DDS) measured as the number of food groups consumed by the child in the previous day out of the following seven: (1) cereals, roots and tubers; (2) legumes and nuts; (3) milk and milk derivatives; (4) meat products (meat, poultry, offal, and fish); (5) eggs; (6) vitamin A-rich fruits and vegetables (leafy green vegetables, yellow fruits and vegetables); and (7) other fruits and vegetables. A DDS of four is considered the minimum DDS for a healthy diet. As children in our sample are at least 22 months old, the DDS is measured excluding milk, following WHO guidelines.

Hand-washing practices are measured as a cumulative score of regularly adopted practices, where each practice is counted as 1 when the respondent reports washing hands with soap in that specific situation and 0 otherwise: after cleaning a baby's bottom, after using the toilet, before preparing and eating food, before feeding children, after disposing of baby feces, before and after handling children, and on other occasions. Total food consumption is measured as recalled household consumption in the past 7 days and is winsorized at the 99th percentile level.

Consistent with the stunting results, we also find positive changes in behaviors related to child food diversity and breastfeeding practices (Table 2), and these results are all significantly larger for the Cash+SBCC arm. In particular, we find a 0.655 unit increase in the child food diversity score (column 1) in the Cash+SBCC arm that is significantly different from the Cash only and the control groups. We also find a change in the proportion of children ever breastfed (0.7 percentage points, column 2) and in the proportion of children who received colostrum (2.1 percentage points, column 3) in the Cash+SBCC intervention arm. Furthermore, we find a 0.651 unit increase in the index of hand-washing behavior (column 4) and a significant

Table 2: Behavior

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | Child dietary diversity score (non-milk, 24 hrs recall) | Prop. of children ever breastfed | Prop. of children received colostrum | Index of hand-washing behavior | Prop. of mothers with at least 4 ANC visits to skilled health personnel | Tot. food consump-tion |
| CASH+SBCC | 0.655*** | 0.007* | 0.021** | 0.651*** | 0.161*** | 3359.345*** |
| | (0.063) | (0.003) | (0.008) | (0.128) | (0.024) | (577.924) |
| CASH | 0.096 | 0.003 | 0.001 | 0.151 | 0.117*** | 1699.517*** |
| | (0.070) | (0.004) | (0.010) | (0.118) | (0.024) | (565.579) |
| Observations | 2154 | 2154 | 2151 | 2134 | 2134 | 2134 |
| Mean Control | 3.39 | 0.99 | 0.96 | 2.60 | 0.67 | 22197.09 |
| Clusters | 102 | 102 | 102 | 102 | 102 | 102 |

The table presents OLS estimates of the effects of the maternal cash transfer program interventions (CASH + SBCC and CASH) on measures of behavior related to four topics covered by the education sessions in SBCC activities (1) IYCF -including diet diversity (column 1) and breastfeeding (columns 2-3), hand-washing practices (column 4), health-seeking behavior (column 5) and food expenditures (column 6). "CASH+SBCC" indicates T1 villages, where cash transfers and SBCC activities were provided jointly; "CASH" indicates T2 villages, where cash transfers only were provided; the reference group are villages in the control group where neither cash transfers nor SBCC took place. Outcomes include: child diversity score constructed following WHO standards, for children at least 22 months old (1); the proportion of children ever breastfed (2); the proportion of children who received colostrum (3); an index of hand washing practices combining whether mothers report always washing hands after cleaning a baby's bottom, after using the toilet, before preparing and eating food, before feeding children, after disposing of baby feces, before and after handling children, and on other occasions (4); the proportion of mothers receiving at least 4 Antenatal Care visits with skilled health personnel, as defined by WHO standards (5); total food consumption, winsorized at the 99th percentile level (in last 7 days, in MMK, 6). Controls include (i) individual demographic controls, including child's sex and age, mother's age and education, and household head's age and education for child-level analysis; mother's age and education, and household head's age and education for mother-level analysis; (ii) village-level controls, including distance to large and small markets, main source of livelihood (agriculture, livestock, or casual labor), availability of government provided electricity, and participation in a concurrent WASH intervention. Fixed effects per geographic strata (34) are included. Standard errors are clustered at the village cluster level. *** p<0.01, ** p<0.05, * p<0.1.

Table 3: Knowledge

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Prop. of mothers who know child food diversity is important | Prop. of mothers who know the meaning of exclusive breastfeeding | Prop. of mothers who know the best time to initiate breastfeeding | Prop. of mothers who know the best time to introduce complementary feeding |
| CASH+SBCC | 0.033** | 0.031* | 0.013*** | 0.089*** |
| | (0.015) | (0.016) | (0.005) | (0.022) |
| CASH | 0.030** | -0.000 | 0.009* | 0.033 |
| | (0.014) | (0.019) | (0.005) | (0.025) |
| Observations | 2134 | 2134 | 2134 | 2134 |
| Mean Control | 0.91 | 0.94 | 0.98 | 0.81 |
| Clusters | 102 | 102 | 102 | 102 |

Notes: The table presents OLS estimates of the effects of the maternal cash transfer program interventions (CASH + SBCC and CASH) on measures of knowledge covered by the education sessions in SBCC activities: Outcomes include: the proportion of mothers who know the importance of food diversity in their children diet (1); the proportion of mothers know the meaning of exclusive breastfeeding (2); the proportion of mothers who know the best time to initiate breastfeeding (3); the proportion of mothers who know the best time to introduce complementary feeding (4). "CASH+SBCC" indicates T1 villages, where cash transfers and SBCC activities were provided jointly; "CASH" indicates T2 villages, where cash transfers only were provided; the reference group are villages in the control group where neither cash transfers nor SBCC took place. Controls include (i) individual demographic controls, including child's sex and age, mother's age and education, and household head's age and education for child-level analysis; mother's age and education, and household head's age and education for mother-level analysis; (ii) village-level controls, including distance to large and small markets, main source of livelihood (agriculture, livestock, or casual labor), availability of government provided electricity, and participation in a concurrent WASH intervention. Fixed effects per geographic strata (34) are included. Standard errors are clustered at the village cluster level. *** p<0.01, ** p<0.05, * p<0.1.

increase (16.1 percentage points for Cash+SBCC and 11.7 percentage points for Cash-only) in the proportion of mothers attending at least 4 antenatal care visits (column 5). Finally, women assigned to the Cash+SBCC intervention also spend significantly more money on food relative to the control group (increase of 3,359 MMK or 2.4 USD, column 6). Women assigned to the Cash-only intervention exhibit a similar positive change, though the increase in spending is less stark (7.66% change in Cash-only arm compared to 15.13% for Cash+SBCC, column 6).

Moreover, consistent with the changes in behavior, we also find treatment effects on maternal knowledge. Table 3 shows a 3 percentage point increase in the proportion of mothers in the Cash+SBCC intervention arm who know the importance of diversity in their child's diet (column 1), along with significant increases in the proportion of mothers who know the correct meaning of exclusive breastfeeding (3.1 percentage points, column 2), the best time to initiate breastfeeding (1.3 percentage points, column 3) and the best time to start complementary feeding (8.9 percentage points, column 4). The estimates are statistically significant for all knowledge measures. It is worth noting the levels of maternal knowledge about infant feeding practices overall: control group means indicate that most women in our sample (80-90%) already have correct information about breastfeeding and feeding practices prior to the intervention.

Overall, the analysis of treatment effects on knowledge shows a high degree of learning from the program, although there is puzzling evidence of a change in knowledge of the importance of child food diversity among women in the cash only arm that is also statistically significant and similar in magnitude to the Cash+SBCC arm. Since these women were not exposed to any training on feeding practices, this effect likely reflects reporting bias (e.g. a form of ex-post rationalization in which mothers who cannot afford to feed children a diverse diet claim that diversity less important).[6]

### III.C. Estimation Issues and Robustness Checks

Although administrative program data show no documented cases of cash being delivered through the program to individuals residing in control villages, two forms of contamination in the SBCC intervention may compromise the validity of some of our estimates. First, according to SCI's administrative data on the SBCC rollout, 18 villages assigned to the Cash-only treatment received SBCC activities for 20 months because of an error in program implementation. Second, SBCC activities were expanded to all Cash-only villages beginning in January 2019, although part of the endline data were collected after December 2018, at which point those respondents had already received at least one month of SBCC activities.

[6] An alternative possibility is learning by doing that results from spending more on child nutrition, but this seems less likely in the absence of an obvious source of knowledge transfer.

To address these two issues, we re-run the analysis excluding those 18 Cash-only villages and all mothers interviewed after December 2018, for a total of 138 mothers or 6.5 percent of the 2,134 women in the analysis sample. Our results are unchanged (Appendix Table 5).

In addition, all of the main results are robust to considering the full endline sample (Appendix Tables 6, 7, 8) identified in the 2017 listings of pregnant mothers. Results are also robust to the clustering of standard errors at the level of the program delivery (village) rather than the unit of randomization (health center catchment area), as shown in Appendix Table 9.

## IV. Conclusion

Our findings provide novel evidence from biomarker data that maternal cash transfer programs delivered for the first 1000 days of life lead to statistically significant reductions in the proportion of children (moderately) stunted, but only when they are combined with intensive Social Behavior Change Communication (SBCC). The significant effects on stunting are concentrated among low SES villages, consistent with the notion that the nutrition programs matter most where vulnerability to malnutrition is highest, yet the combination of interventions improved outcomes only among those at risk of moderate but not severe stunting. These patterns provides insight into which sub populations are most easily reached by such interventions, and indicate that greater efforts are needed to combat severe malnutrition; for instance, tailoring SBCC programming to households with low levels of resources or facing chronic infections may be needed to address the most severe cases of malnutrition.

The program appears to increase child nutrition through a combination of pathways, including improving dietary diversity, breastfeeding and hand washing practices, prenatal care and food consumption. In contrast, cash alone improves prenatal care and food consumption but to a lesser extent, and has no measurable impact on dietary diversity, breastfeeding or hand washing practices.

The findings underscore the importance of adding information components to social safety net programs involving cash disbursement in order to successfully change investment in human capital and thereby disrupt the intergenerational cycle of poverty. Given the high and growing internet penetration in Myanmar (International Telecommunication Union, 2018), as in several low- and middle-income countries, digital platforms may provide a particularly cost-effective means of delivering SBCC to program beneficiaries at scale. However, while our analysis indicates that SBCC was fundamental in changing mothers' IYFC knowledge and practices, further research is needed to better understand which ingredients in the SBCC package are key to realizing improvements in stunting, and what curricular components are needed to maximize the child health gains.

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# Appendix: Additional Tables and Figures

Table 1: Balance on woman-level characteristics

| | T1 | T2 | CG | PV (T1-CG) | PV (T2-CG) | N(T1/T2/CG) |
|---|---|---|---|---|---|---|
| Resp married | 0.96 | 0.97 | 0.96 | 0.581 | 0.189 | 769 / 744 / 620 |
| | (0.19) | (0.17) | (0.20) | | | |
| Resp age | 32.07 | 31.41 | 31.39 | 0.082* | 0.964 | 769 / 744 / 621 |
| | (6.38) | (6.53) | (6.18) | | | |
| Resp educ years | 5.71 | 5.84 | 6.09 | 0.134 | 0.339 | 769 / 744 / 621 |
| | (3.17) | (3.32) | (3.36) | | | |
| HH size | 4.92 | 4.99 | 4.83 | 0.418 | 0.164 | 769 / 744 / 621 |
| | (1.69) | (1.80) | (1.63) | | | |
| Tot. biological children U5 | 1.14 | 1.12 | 1.14 | 0.975 | 0.326 | 769 / 744 / 621 |
| | (0.36) | (0.33) | (0.36) | | | |
| HH head age | 40.46 | 39.76 | 39.94 | 0.605 | 0.864 | 769 / 744 / 621 |
| | (13.98) | (13.37) | (14.43) | | | |
| HH head sex | 1.08 | 1.08 | 1.07 | 0.585 | 0.699 | 769 / 744 / 621 |
| | (0.28) | (0.27) | (0.26) | | | |
| HH head tot yrs educ | 5.47 | 5.81 | 6.04 | 0.032** | 0.371 | 769 / 744 / 621 |
| | (3.14) | (3.33) | (3.34) | | | |
| HH head worked past 3m | 0.89 | 0.83 | 0.86 | 0.642 | 0.426 | 769 / 744 / 621 |
| | (0.65) | (0.38) | (0.60) | | | |
| HH head income past 3mo | 350743.23 | 335991.91 | 334404.03 | 0.654 | 0.967 | 768 / 742 / 620 |
| | (466361.87) | (500633.62) | (483130.36) | | | |
| Any electricity | 0.42 | 0.38 | 0.48 | 0.503 | 0.177 | 769 / 744 / 621 |
| | (0.49) | (0.49) | (0.50) | | | |
| Always electricity | 0.38 | 0.33 | 0.41 | 0.718 | 0.309 | 762 / 733 / 614 |
| | (0.49) | (0.47) | (0.49) | | | |
| Cooking fuel electricity | 0.29 | 0.24 | 0.30 | 0.881 | 0.253 | 769 / 744 / 621 |
| | (0.46) | (0.43) | (0.46) | | | |
| Tot no. rooms in house | 1.14 | 1.17 | 1.13 | 0.890 | 0.536 | 767 / 739 / 619 |
| | (0.80) | (0.79) | (0.75) | | | |
| Improved roof material | 0.86 | 0.85 | 0.87 | 0.866 | 0.698 | 769 / 744 / 621 |
| | (0.34) | (0.35) | (0.34) | | | |
| Improved wall material | 0.23 | 0.22 | 0.21 | 0.436 | 0.750 | 769 / 744 / 621 |
| | (0.42) | (0.41) | (0.41) | | | |
| Improved floor material | 0.33 | 0.31 | 0.31 | 0.642 | 0.989 | 769 / 744 / 621 |
| | (0.47) | (0.46) | (0.46) | | | |

This table presents the balance check on individual characteristics by treatment arm for the sample of mothers who were pregnant at enrollment included in the analysis. T1 ("CASH+SBCC") refer to villages where cash transfers and SBCC activities were provided jointly; T2 ("CASH") refer to villages where cash transfers only were provided; CG (control group) refer to villages where neither cash transfers nor SBCC took place. Fixed effects per geographic strata (34) are included. Standard errors are clustered at the village cluster level. P-values from t-test from the difference in means are reported. *** p<0.01, ** p<0.05, * p<0.1.

Table 2: Balance on village-level characteristics

| | | | | | | |
|---|---|---|---|---|---|---|
| Tot. population (No. HH) | 182.17 | 175.54 | 160.92 | 0.263 | 0.418 | 133 / 135 / 139 |
| | (128.98) | (135.99) | (106.39) | | | |
| Tot. literacy rate | 85.19 | 85.50 | 83.58 | 0.384 | 0.247 | 133 / 135 / 139 |
| | (13.45) | (12.50) | (12.87) | | | |
| Main livelihood: Agriculture | 0.92 | 0.85 | 0.91 | 0.654 | 0.312 | 133 / 135 / 139 |
| | (0.26) | (0.36) | (0.29) | | | |
| Main livelihood: Livestock | 0.29 | 0.30 | 0.24 | 0.583 | 0.500 | 133 / 135 / 139 |
| | (0.45) | (0.46) | (0.43) | | | |
| Main livelihood: Casual Labor | 0.77 | 0.79 | 0.76 | 0.779 | 0.714 | 133 / 135 / 139 |
| | (0.42) | (0.41) | (0.43) | | | |
| Type land-dry land farming | 0.53 | 0.64 | 0.55 | 0.837 | 0.370 | 133 / 135 / 139 |
| | (0.50) | (0.48) | (0.50) | | | |
| Type land-flood plains or irrigated | 0.47 | 0.35 | 0.44 | 0.780 | 0.322 | 133 / 135 / 139 |
| | (0.50) | (0.48) | (0.50) | | | |
| Accessible by car/truck in all weather | 0.79 | 0.79 | 0.75 | 0.614 | 0.677 | 133 / 135 / 139 |
| | (0.41) | (0.41) | (0.44) | | | |
| Village has Gov electricity | 0.24 | 0.22 | 0.22 | 0.839 | 0.992 | 133 / 135 / 139 |
| | (0.43) | (0.42) | (0.42) | | | |
| Village has primary school | 0.63 | 0.58 | 0.59 | 0.544 | 0.832 | 133 / 135 / 139 |
| | (0.48) | (0.50) | (0.49) | | | |
| Village has small markets | 0.02 | 0.05 | 0.03 | 0.735 | 0.352 | 133 / 135 / 139 |
| | (0.15) | (0.22) | (0.17) | | | |
| Village has home markets | 0.97 | 0.96 | 0.96 | 0.773 | 0.729 | 133 / 135 / 139 |
| | (0.17) | (0.21) | (0.19) | | | |
| Distance to large market | 34.76 | 32.96 | 40.24 | 0.310 | 0.150 | 133 / 135 / 139 |
| | (24.83) | (20.05) | (26.39) | | | |
| Distance to small markets | 24.77 | 20.46 | 28.07 | 0.487 | 0.084* | 133 / 135 / 139 |
| | (18.62) | (15.49) | (23.55) | | | |
| Village has health facility | 0.16 | 0.19 | 0.19 | 0.269 | 0.803 | 133 / 135 / 139 |
| | (0.37) | (0.39) | (0.40) | | | |
| Village has midwife | 0.21 | 0.21 | 0.24 | 0.358 | 0.269 | 133 / 135 / 139 |
| | (0.41) | (0.41) | (0.43) | | | |
| Water shortage past year | 0.42 | 0.46 | 0.36 | 0.441 | 0.189 | 133 / 135 / 139 |
| | (0.50) | (0.50) | (0.48) | | | |

This table presents the balance check on village characteristics by treatment arm for the sample of villages included in the analysis. T1 ("CASH+SBCC") refer to villages where cash transfers and SBCC activities were provided jointly; T2 ("CASH") refer to villages where cash transfers only were provided; CG (control group) refer to villages where neither cash transfers nor SBCC took place. Fixed effects per geographic strata (34) are included. Standard errors are clustered at the village cluster level. P-values from t-test from the difference in means are reported. *** p<0.01, ** p<0.05, * p<0.1.

Table 3: Children Stunting - by village socio-economic status (SES)

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Prop. of children stunted | Prop. of children moderately stunted | Prop. of children severely stunted | HAZ score (WHO) |
| Panel A: Low SES Villages | | | | |
| CASH+SBCC | -0.093** | -0.093*** | 0.001 | 0.158** |
| | (0.037) | (0.032) | (0.020) | (0.071) |
| CASH | -0.041 | -0.055 | 0.014 | -0.026 |
| | (0.038) | (0.035) | (0.020) | (0.070) |
| Observations | 1051 | 1051 | 1051 | 1051 |
| Mean Control | 0.34 | 0.27 | 0.07 | -1.57 |
| Clusters | 92 | 92 | 92 | 92 |
| Panel B: High SES Villages | | | | |
| CASH+SBCC | 0.044 | 0.020 | 0.024 | -0.036 |
| | (0.031) | (0.030) | (0.016) | (0.078) |
| CASH | 0.057* | 0.048 | 0.009 | -0.069 |
| | (0.033) | (0.031) | (0.014) | (0.080) |
| Observations | 961 | 961 | 961 | 961 |
| Mean Control | 0.34 | 0.27 | 0.07 | -1.57 |
| Clusters | 86 | 86 | 86 | 86 |

Notes: The table presents OLS estimates of the effects of the maternal cash transfer program interventions (CASH + SBCC and CASH) on measures of stunting for children whose mothers were pregnant at enrollment, following WHO classification."CASH+SBCC" indicates T1 villages, where cash transfers and SBCC activities were provided jointly; "CASH" indicates T2 villages, where only cash transfers were provided; the reference group are villages in the control group where neither cash transfers nor SBCC took place. Outcomes include the proportion of children stunted as children with Height for Age Z score (HAZ) ¡ -2 (1); the proportion of children moderately stunted as children with HAZ < -2 and >= -3 (2); the proportion of children severely stunted as children with HAZ < -3 (3); and, HAZ (4). Controls include (i) individual demographic controls, including child's sex and age, mother's age and education, and household head's age and education; (ii) village-level controls, including distance to large and small markets, main source of livelihood (agriculture, livestock, or casual labor), availability of government provided electricity, and participation in a concurrent WASH intervention. The analysis excludes the sample contaminated by the imperfect implementation (139 children). Low or high SES is proxied by the average number of years of education attained by resident women below or above the median.

Table 4: Children Stunting - by village socio-economic status (SES) and household income

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Prop. of children stunted | Prop. of children moderately stunted | Prop. of children severely stunted | HAZ score (WHO) |
| Panel A: Low SES, Low income | | | | |
| CASH+SBCC | -0.140*** | -0.122** | -0.017 | 0.210** |
| | (0.050) | (0.047) | (0.029) | (0.099) |
| CASH | -0.053 | -0.034 | -0.019 | -0.010 |
| | (0.056) | (0.052) | (0.030) | (0.104) |
| Observations | 544 | 544 | 544 | 544 |
| Mean Control | 0.43 | 0.35 | 0.08 | -1.72 |
| Clusters | 89 | 89 | 89 | 89 |
| Panel B: Low SES, High income | | | | |
| CASH+SBCC | -0.028 | -0.059 | 0.031 | 0.029 |
| | (0.047) | (0.050) | (0.030) | (0.087) |
| CASH | -0.012 | -0.065 | 0.053* | -0.089 |
| | (0.043) | (0.046) | (0.030) | (0.079) |
| Observations | 507 | 507 | 507 | 507 |
| Mean Control | 0.42 | 0.35 | 0.07 | -1.69 |
| Clusters | 86 | 86 | 86 | 86 |
| Panel C: High SES, Low Income | | | | |
| CASH+SBCC | 0.039 | 0.027 | 0.012 | 0.035 |
| | (0.045) | (0.039) | (0.024) | (0.105) |
| CASH | 0.054 | 0.059 | -0.005 | -0.015 |
| | (0.047) | (0.040) | (0.021) | (0.097) |
| Observations | 454 | 454 | 454 | 454 |
| Mean Control | 0.26 | 0.18 | 0.07 | -1.50 |
| Clusters | 81 | 81 | 81 | 81 |
| Panel D: High SES, High Income | | | | |
| CASH+SBCC | 0.029 | 0.003 | 0.025 | -0.084 |
| | (0.045) | (0.044) | (0.024) | (0.111) |
| CASH | 0.078 | 0.044 | 0.034 | -0.178 |
| | (0.053) | (0.053) | (0.025) | (0.132) |
| Observations | 507 | 507 | 507 | 507 |
| Mean Control | 0.27 | 0.22 | 0.05 | -1.39 |
| Clusters | 80 | 80 | 80 | 80 |

Notes: The table presents OLS estimates of the effects of the maternal cash transfer program interventions (CASH + SBCC and CASH) on measures of stunting for children whose mothers were pregnant at enrollment, following WHO classification."CASH+SBCC" indicates T1 villages, where cash transfers and SBCC activities were provided jointly; "CASH" indicates T2 villages, where only cash transfers were provided; the reference group are villages in the control group where neither cash transfers nor SBCC took place. Outcomes include the proportion of children stunted as children with Height for Age Z score (HAZ) ¡ -2 (1); the proportion of children moderately stunted as children with HAZ < -2 and >= -3 (2); the proportion of children severely stunted as children with HAZ < -3 (3); and, HAZ (4). Controls include (i) individual demographic controls, including child's sex and age, mother's age and education, and household head's age and education; (ii) village-level controls, including distance to large and small markets, main source of livelihood (agriculture, livestock, or casual labor), availability of government provided electricity, and participation in a concurrent WASH intervention. The analysis excludes the sample contaminated by the imperfect implementation (139 children). Low or high SES is proxied by the average number of years of education attained by resident women below or above the median. Low or high income is defined as below or above the household median income. Fixed effects per geographic strata (34) are included. Standard errors are clustered at the village cluster level. *** p<0.01, ** p<0.05, * p<0.1.

Table 5: Children Stunting - addressing contamination

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Prop. of children stunted | Prop. of children moderately stunted | Prop. of children severely stunted | HAZ score (WHO) |
| CASH+SBCC | -0.050** | -0.057*** | 0.007 | 0.074 |
| | (0.022) | (0.018) | (0.011) | (0.047) |
| CASH | -0.002 | -0.006 | 0.004 | -0.031 |
| | (0.025) | (0.022) | (0.012) | (0.044) |
| Observations | 2012 | 2012 | 2012 | 2012 |
| Mean Control | 0.34 | 0.27 | 0.07 | -1.57 |
| Clusters | 102 | 102 | 102 | 102 |

Notes: The table presents OLS estimates of the effects of the maternal cash transfer program interventions (CASH + SBCC and CASH) on measures of stunting for children whose mothers were pregnant at enrollment, following WHO classification.'CASH+SBCC" indicates T1 villages, where cash transfers and SBCC activities were provided jointly; "CASH" indicates T2 villages, where only cash transfers were provided; the reference group are villages in the control group where neither cash transfers nor SBCC took place. Outcomes include the proportion of children stunted as children with Height for Age Z score (HAZ) ¡ -2 (1); the proportion of children moderately stunted as children with HAZ < -2 and >= -3 (2); the proportion of children severely stunted as children with HAZ < -3 (3); and, HAZ (4). Controls include (i) individual demographic controls, including child's sex and age, mother's age and education, and household head's age and education; (ii) village-level controls, including distance to large and small markets, main source of livelihood (agriculture, livestock, or casual labor), availability of government provided electricity, and participation in a concurrent WASH intervention. The analysis excludes the sample contaminated by the imperfect implementation (139 children). Fixed effects per geographic strata (34) are included. Standard errors are clustered at the village cluster level. *** p<0.01, ** p<0.05, * p<0.1.

Table 6: Children Stunting - endline full sample

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Prop. of children stunted | Prop. of children moderately stunted | Prop. of children severely stunted | HAZ score (WHO) |
| CASH+SBCC | -0.038** | -0.042*** | 0.004 | 0.060* |
| | (0.016) | (0.015) | (0.009) | (0.035) |
| CASH | -0.006 | -0.009 | 0.003 | -0.014 |
| | (0.017) | (0.016) | (0.009) | (0.035) |
| Observations | 3176 | 3176 | 3176 | 3176 |
| Mean Control | 0.35 | 0.28 | 0.06 | -1.58 |
| Clusters | 102 | 102 | 102 | 102 |

The table presents OLS estimates of the effects of the maternal cash transfer program interventions (CASH + SBCC and CASH) on measures of stunting for children whose mothers were pregnant at enrollment, following WHO classification."CASH+SBCC" indicates T1 villages, where cash transfers and SBCC activities were provided jointly; "CASH" indicates T2 villages, where only cash transfers were provided; the reference group are villages in the control group where neither cash transfers nor SBCC took place. Outcomes include the proportion of children stunted as children with Height for Age Z score (HAZ) < -2 (1); the proportion of children moderately stunted as children with HAZ < -2 and >= -3 (2); the proportion of children severely stunted as children with HAZ < -3 (3); and, HAZ (4). Controls include (i) individual demographic controls, including child's sex and age, mother's age and education, and household head's age and education; (ii) village-level controls, including distance to large and small markets, main source of livelihood (agriculture, livestock, or casual labor), availability of government provided electricity, and participation in a concurrent WASH intervention. The analysis includes the entire endline sample. Fixed effects per geographic strata (34) are included. Standard errors are clustered at the village cluster level. P-values from t-test from the difference in means are reported. ***p<0.01, ** p<0.05, * p<0.1.

Table 7: Knowledge - endline full sample

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Prop. of mothers who know child food diversity is important | Prop. of mothers who know the meaning of exclusive breastfeeding | Prop. of mothers who know the best time to initiate breastfeeding | Prop. of mothers who know the best time to introduce complementary feeding |
| CASH+SBCC | 0.034*** | 0.035*** | 0.011*** | 0.098*** |
| | (0.011) | (0.013) | (0.004) | (0.019) |
| CASH | 0.026** | -0.004 | 0.006 | 0.058*** |
| | (0.011) | (0.015) | (0.004) | (0.022) |
| Observations | 3160 | 3160 | 3160 | 3160 |
| Mean Control | 0.92 | 0.94 | 0.99 | 0.79 |
| Clusters | 102 | 102 | 102 | 102 |

Notes: The table presents OLS estimates of the effects of the maternal cash transfer program interventions (CASH + SBCC and CASH) on measures of knowledge covered by the education sessions in SBCC activities: Outcomes include: the proportion of mothers who know the importance of food diversity in their children diet (1); the proportion of mothers know the meaning of exclusive breastfeeding (2); the proportion of mothers who know the best time to initiate breastfeeding (3); the proportion of mothers who know the best time to introduce complementary feeding (4). "CASH+SBCC" indicates T1 villages, where cash transfers and SBCC activities were provided jointly; "CASH" indicates T2 villages, where cash transfers only were provided; the reference group are villages in the control group where neither cash transfers nor SBCC took place. Controls include (i) individual demographic controls, including child's sex and age, mother's age and education, and household head's age and education for child-level analysis; mother's age and education, and household head's age and education for mother-level analysis; (ii) village-level controls, including distance to large and small markets, main source of livelihood (agriculture, livestock, or casual labor), availability of government provided electricity, and participation in a concurrent WASH intervention. The analysis includes the entire endline sample. Fixed effects per geographic strata (34) are included. Standard errors are clustered at the village cluster level. *** p<0.01, ** p<0.05, * p<0.1.

Table 8: Behavior - endline full sample

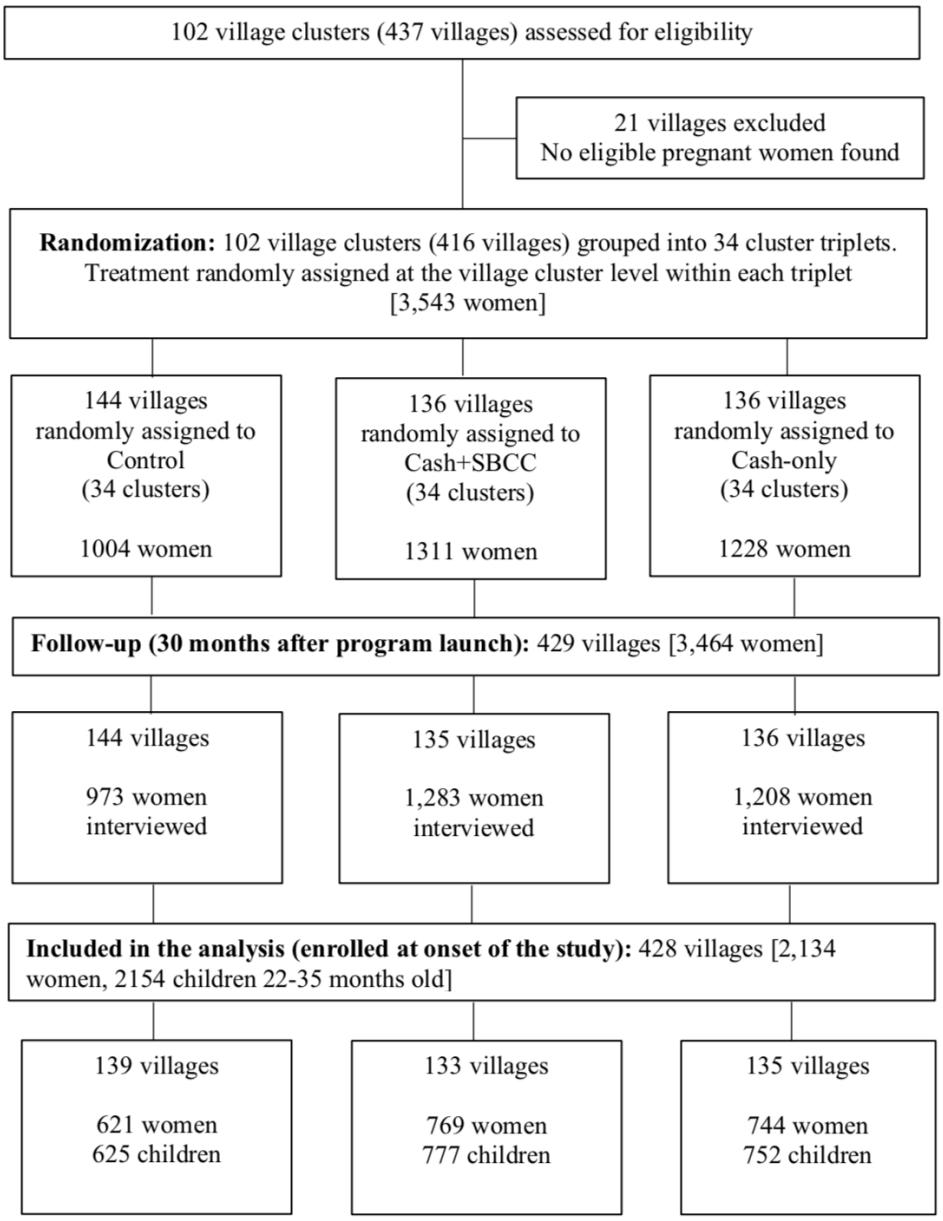
| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | Child dietary diversity score (non-milk, 24 hrs recall) | Prop. of children ever breastfed | Prop. of children received colostrum | Index of hand-washing behavior | Prop. of mothers with at least 4 ANC visits to skilled health personnel | Tot. food consumption |
| CASH+SBCC | 0.609*** | 0.003 | 0.020** | 0.634*** | 0.162*** | 3550.647*** |
| | (0.061) | (0.003) | (0.008) | (0.096) | (0.021) | (507.174) |
| CASH | 0.138** | -0.000 | -0.003 | 0.156 | 0.117*** | 1486.439*** |
| | (0.063) | (0.003) | (0.008) | (0.100) | (0.023) | (496.890) |
| Observations | 3186 | 3186 | 3183 | 3160 | 3160 | 3160 |
| Mean Control | 3.32 | 1.00 | 0.96 | 2.55 | 0.67 | 22094.25 |
| Clusters | 102 | 102 | 102 | 102 | 102 | 102 |

The table presents OLS estimates of the effects of the maternal cash transfer program interventions (CASH + SBCC and CASH) on measures of behavior related to four topics covered by the education sessions in SBCC activities (1) IYCF -including diet diversity (column 1) and breastfeeding (columns 2-3), hand-washing practices (column 4), health-seeking behavior (column 5) and food expenditures (column 6). "CASH+SBCC" indicates T1 villages, where cash transfers and SBCC activities were provided jointly; "CASH" indicates T2 villages, where cash transfers only were provided; the reference group are villages in the control group where neither cash transfers nor SBCC took place. Outcomes include: child diversity score constructed following WHO standards, for children at least 22 months old (1); the proportion of children ever breastfed (2); the proportion of children who received colostrum (3); an index of hand washing practices combining whether mothers report always washing hands after cleaning a baby's bottom, after using the toilet, before preparing and eating food, before feeding children, after disposing of baby feces, before and after handling children, and on other occasions (4); the proportion of mothers receiving at least 4 Antenatal Care visits with skilled health personnel, as defined by WHO standards (5); total food consumption, winsorized at the 99th percentile level (in last 7 days, in MMK, 6). Controls include (i) individual demographic controls, including child's sex and age, mother's age and education, and household head's age and education for child-level analysis; mother's age and education, and household head's age and education for mother-level analysis; (ii) village-level controls, including distance to large and small markets, main source of livelihood (agriculture, livestock, or casual labor), availability of government provided electricity, and participation in a concurrent WASH intervention. The analysis includes the entire endline sample. Fixed effects per geographic strata (34) are included. Standard errors are clustered at the village cluster level. *** p<0.01, ** p<0.05, * p<0.1.

Table 9: Children Stunting - standard errors clustered at village level

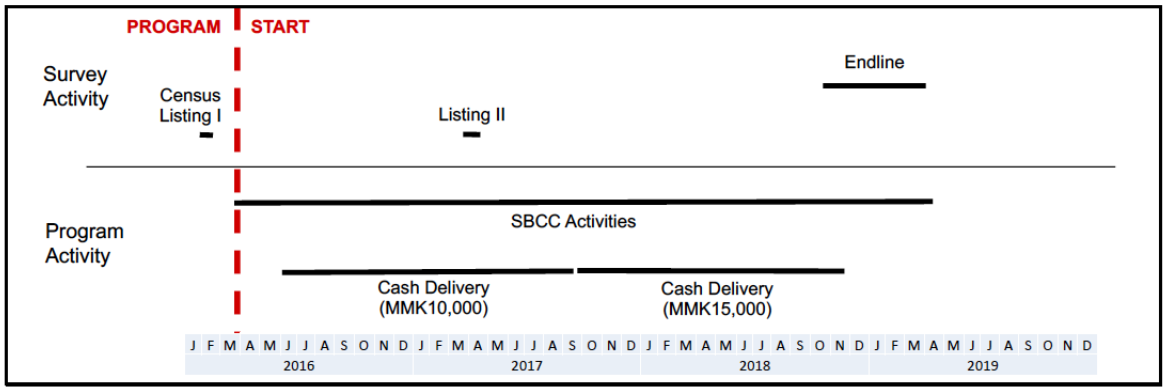
| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Prop. of children stunted | Prop. of children moderately stunted | Prop. of children severely stunted | HAZ score (WHO) |
| CASH+SBCC | -0.046* | -0.053** | 0.007 | 0.074 |
| | (0.025) | (0.023) | (0.014) | (0.054) |
| CASH | -0.004 | -0.008 | 0.004 | -0.017 |
| | (0.026) | (0.024) | (0.014) | (0.051) |
| Observations | 2151 | 2151 | 2151 | 2151 |
| Mean Control | 0.34 | 0.27 | 0.07 | -1.57 |
| Clusters | 407 | 407 | 407 | 407 |

Notes: The table presents OLS estimates of the effects of the maternal cash transfer program interventions (CASH + SBCC and CASH) on measures of stunting for children whose mothers were pregnant at enrollment, following WHO classification.'CASH+SBCC" indicates T1 villages, where cash transfers and SBCC activities were provided jointly; "CASH" indicates T2 villages, where only cash transfers were provided; the reference group are villages in the control group where neither cash transfers nor SBCC took place. Outcomes include the proportion of children stunted as children with Height for Age Z score (HAZ) ¡ -2 (1); the proportion of children moderately stunted as children with HAZ < -2 and >= -3 (2); the proportion of children severely stunted as children with HAZ < -3 (3); and, HAZ (4). Controls include (i) individual demographic controls, including child's sex and age, mother's age and education, and household head's age and education; (ii) village-level controls, including distance to large and small markets, main source of livelihood (agriculture, livestock, or casual labor), availability of government provided electricity, and participation in a concurrent WASH intervention. Fixed effects per geographic strata (34) are included. Standard errors are clustered at the village level. *** p<0.01, ** p<0.05, * p<0.1.



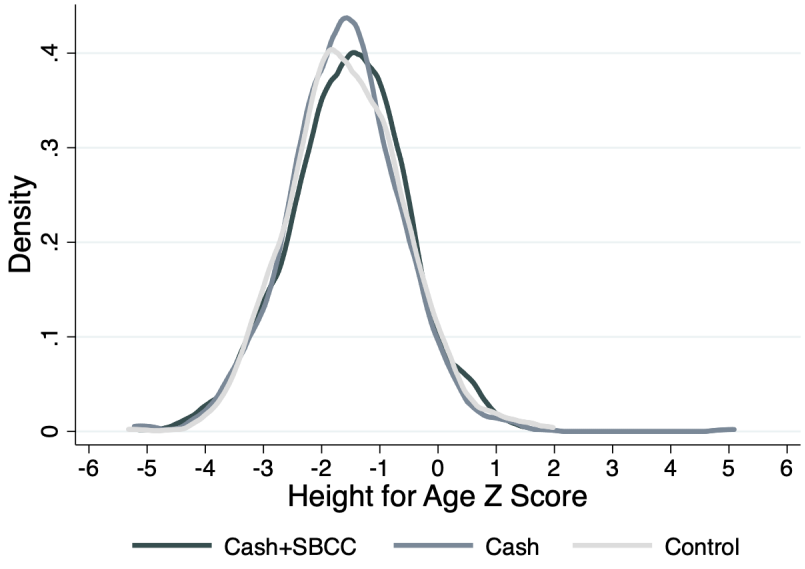

Notes: This figure presents the profile of the randomized controlled trial.

Figure 1: Profile of the Randomized Controlled Trial




Notes: This figure presents the timeline of the data collection rounds (survey activity) and the maternal cash transfer program rollout (program activity).

**Figure 2: Timeline**




Notes: This figure describes the distribution of Height for Age Z score (HAZ) for children whose mothers were pregnant at enrollment, by treatment status. "CASH+SBCC" indicates T1 villages, where cash transfers and SBCC activities were provided jointly; "CASH" indicates T2 villages, where cash transfers only were provided; "Control" indicates villages in the control group where neither cash transfers nor SBCC took place.

Figure 3: Child HAZ distribution, by treatment