Engaging women's groups to improve nutrition:

Findings from an evaluation of the JEEViKA multisectoral convergence pilot in Saharsa, Bihar

INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE
IFPRI

Oxford Policy Management

October 2019

ENGAGING WOMEN'S GROUPS TO IMPROVE NUTRITION

FINDINGS FROM AN EVALUATION OF THE JEEViKA MULTISECTORAL CONVERGENCE PILOT IN SAHARSA, BIHAR

An Impact Evaluation Report Submitted to the World Bank Strategic Impact Evaluation Fund

Authors (in alphabetical order):

Shivani Gupta

Neha Kumar

Purnima Menon

Shinjini Pandey

Kalyani Raghunathan

June 25, 2019

Table of Contents

Acronyms

Acronym	Full form
ANC	Antenatal care
ANCOVA	Analysis of covariance
AD	Annaprashan Divas
BHSNI	Block Health, Sanitation and Nutrition Integrators
BPM	Block Project Manager
BD	Bachpan Divas
BCC	Behavior change communication
BMI	Body Mass Index
CM	Community mobilizer
CRP	Community Resource Person
FAO	Food and Agriculture Organization
FLW	Frontline worker
FSF	Food Security Fund
HFIAS	Household Food Insecurity Access Scale
HAZ	Height-for-age Z-score
HH	Household
HRF	Health Risk Fund
HSC	Health Subcommittee
ICDS	Integrated Child Development Scheme
IFA	Iron folic acid
IFPRI	International Food Policy Research Institute
INR	Indian rupees
IRB	Institutional Review Board
ITT	Intent-to-treat
IYCF	Infant and Young Child Feeding
JEEViKA-MC	JEEViKA Multisectoral Convergence Model
MDD	Minimum dietary diversity
NGO	Nongovernmental organization
ORS	Oral rehydration salts
PDS	Public Distribution System
PE	Process Evaluation
PP	Percentage point
RCT	Randomized controlled trial
SHAN	Sanitation Health and Nutrition Fund
SHG	Self-help group
SIEF	Strategic Impact Evaluation Fund
VHSND	Village Health Sanitation and Nutrition Day
VO	Village organization
VRP	Village Resource Person
WASH	Water, sanitation and hygiene
WAZ	Weight-for-age Z-score
WHO	World Health Organization
WHZ	Weight-for-height Z-score

Figures

Tables

Acknowledgments

We acknowledge excellent research assistance provided by Tarana Chauhan, Suman Chakrabarti, and Vinitha Rachel Varghese, who assisted with field supervision, data cleaning, and analysis at various points along the course of this project. We also thank Rasmi Avula, who led the process evaluation that greatly improved our understanding of the pilot. In addition, we would like to thank Ashi Kohli Kathuria at the World Bank for her leadership in designing the convergence pilot and initiating the partnership with IFPRI to conduct this study. We are grateful to her, and to Rajni Khanna, Vinay Singh, Alok Kashyap, and Anand Kothari for constant feedback and support throughout the evaluation period, and for their responsiveness to the findings from the baseline survey and process evaluation. We are extremely grateful to Vinay Singh for his efforts in collecting the cost data and his contributions to the costing analysis in this report. We also thank Shruti Viswanathan, Vinaya Padmanabhan, Vipul Singhal, and the entire team at Oxford Policy Management (OPM) who led the data collection for this impact evaluation. We are grateful for the administrative and financial management support provided by Lynette Aspillera, Nelly Tico, Wilmer Gutierrez, and Jay Willis at IFPRI.

This work has received core financial support from the World Bank's Strategic Impact Evaluation Fund (SIEF). Additional support was also provided by the Bill & Melinda Gates Foundation through the *Women Improving Nutrition through Group-based Programs (WINGS)* program [grant number OPP1132181] and the CGIAR Research Program on Agriculture for Nutrition and Health. We, the authors of this report, are solely responsible for its contents.

EXECUTIVE SUMMARY

This report presents the endline findings of an impact evaluation of the JEEViKA Multisectoral Convergence pilot, designed as an effectiveness trial, in one district in Bihar, India. JEEViKA, a rural livelihoods project, supports self-help groups (SHGs) – savings and credit-based groups of about 15-20 women, mostly targeted towards those from poor households – with the aim of improving their livelihoods and enhancing household incomes. The JEEViKA Multisectoral Convergence (JEEViKA-MC) pilot went a step further, leveraging these SHGs to address the immediate and underlying determinants of undernutrition among women and children. The multisectoral convergence model was developed by the Bihar Rural Livelihoods Promotion Society with technical support from the World Bank and piloted in 12 Gram Panchayats of Saharsa district in Bihar. Two complementary sets of interventions—health and nutrition behavior change communication (BCC) to improve women's knowledge and household practices, and efforts to improve service access through convergence — were layered onto the existing core package of JEEViKA activities and were targeted to women who were members of the SHGs already formed by JEEViKA. Within this target population, households with young children, mothers of young children, and pregnant women were the primary focus of the JEEViKA-MC pilot.

The evaluation described in this report was designed as a randomized controlled trial using a panel survey of women with children 6–23 months of age at baseline. The main questions it set out to answer were:

- Do the JEEViKA-MC interventions lead to improved nutrition outcomes, as measured by improved body mass index of women of reproductive age when compared to the basic JEEViKA intervention?
- Do the JEEViKA-MC interventions improve health, hygiene, and nutrition knowledge and practices of SHG members and mothers of young children compared to the basic JEEViKA intervention?
- Do the JEEViKA-MC interventions increase utilization of government health, nutrition, and sanitation programs as well as JEEViKA food security-related services?

The primary outcomes assessed in this study were women's body mass index (BMI) and reported dietary diversity for children aged 6–23 months. Several secondary outcomes were assessed for women, children and at the household level. For women, secondary outcomes included reported dietary diversity, and health, hygiene, and nutrition knowledge and practices. For children, secondary outcomes included anthropometric outcomes, infant and young child feeding practices, and morbidity among children. Finally, for households, outcomes included household food security, use of government programs as well as JEEViKA food security-related services, and adoption of hygiene and sanitation practices (including handwashing and use of latrines).

The key findings of the impact evaluation highlight that the JEEViKA-MC pilot had small but significant impacts on women's and children's reported dietary diversity, but not on anthropometric outcomes for either women or children. The intervention worked through anticipated pathways, delivering higher exposure to key messages on nutrition through the self-help group platform, and contributing to improved knowledge about nutrition and improvement of some practices among women covered by the pilot program. There were no impacts on utilization of government programs.

Intervention

Core JEEViKA interventions include the organization of rural women into SHGs, training and strengthening the SHGs, federation of the SHGs into Village Organizations (VOs) and Cluster-Level Federations (CLFs), bank linkages for the SHGs and their federations, and improvement of livelihoods

and women's empowerment through extension services and related interventions. The JEEViKA-MC pilot utilized this basic framework, and added two additional treatments:

Promoting household behavior change: Intensive health and nutrition BCC was provided by the JEEViKA cadre of Community Mobilizers (CMs), who were trained to deliver messages on maternal and child nutrition and health, water, sanitation, and hygiene behaviors at bi-monthly SHG meetings, through the dissemination of a series of videos on health and nutrition, and targeted home visits, peer group meetings, and community events. The CMs were already engaged as bookkeepers, with each CM catering to about 15 SHGs; in the treatment arm CMs were additionally tasked with the provision of BCC.

Strengthening convergence to improve access and utilization of key public services: The pilot aimed to strengthen the supply side of government services to meet the growing demand for health and nutrition services that would be generated through increasing awareness at the household level. This component underwent considerable change over the course of the pilot. Initially, this component consisted of monthly 'convergence and coordination committee' meetings of government officials at the district, block and panchayat level. Issues related to service provision would be raised with the relevant department official and escalated through the appropriate channels till a solution had been provided. However, it proved to be close to impossible to coordinate the schedules of all the participants at each level, and meetings were infrequent. Ultimately support for the formation of these committees was withdrawn in July 2017. In addition to these committees, it was planned that existing Integrated Child Development Scheme (ICDS) platforms – the Annaprashan and Bachpan diwas held at the Anganwadi Centers (AWCs) – would be used to coordinate among the health and Integrated Child Development Scheme frontline workers and the JEEViKA CM, and to provide targeted health and nutrition advice to groups of pregnant or lactating women. However, attendance at these events was low, and coordination between the various frontline workers limited, and use of these paltforms diminished by October 2017. Finally, the pre-existing but largely defunct Village organization level Health Subcommittee, a 3-member volunteer committee of women, was provided training on certain health and nutrition topics, and tasked with assisting government frontline workers and CMs with identification of women within the target window, and with home visits for pregnant and lactating women. The final change to this component – the recruitment and training of the Health Subcommittee members – was ongoing during the process evaluation, more than a year into the implementation.

Evaluation design and methods

The impact evaluation used a cluster-randomized controlled trial design. It was conducted across three pilot implementation blocks that had mature self-help groups (i.e. groups formed in 2011). Of the 24 available comparable village administrative clusters, called gram panchayats (GPs), we allocated 12 to receive the JEEViKA-MC pilot treatment interventions and another 12 as a comparison group. Cluster randomization was done through simple random sampling.

Two rounds of panel data were collected from selected households. The baseline survey was conducted in April–May 2016, and the endline survey was initially planned for April–May 2018. For the baseline survey, 5 villages were chosen at random from each of the 24 Gram Panchayats. In cases where there were fewer than 5 villages per Gram Panchayat, we included all villages in the Gram Panchayat in the survey and increased the number of households per Gram Panchayat. In each sampled village selected 25 households were selected that had a woman who satisfied the following criteria – (1) she belonged to a household where at least one woman was a member of a JEEViKA SHG and (2) she had at least one child age 6–23 months. The same households were surveyed during the endline.

At baseline, we interviewed the mother of the child under the age of 2 (the respondent woman) and her husband, or in his absence, a decision-making adult male (the respondent man). The youngest child 6–

23 months of age was denoted the "index" child, and this child was followed up in the endline survey. In addition, if the respondent woman had given birth in the interim period between baseline and endline, then the youngest child 6–23 months of age in the household at endline was also included in order to assess impacts on IYCF indicators. At baseline, we interviewed a total of 2,246 households, of which 94.2 percent were re-interviewed at endline. We also managed to capture information on 1,881 index children and 805 youngest children at endline. In addition, community surveys and surveys of key actors (e.g. the CM) were conducted at both baseline and endline.

A mixed-methods process evaluation was conducted in April–May 2017 to provide insight into implementation challenges. To give time for the intervention to respond to the process evaluation findings on design fidelity and implementation strengthening, and to allow for multiple changes to the second component as described above, the endline survey was moved to October–November 2018. This change in timing resulted in a seasonality shift between the baseline and endline, however, the availability of a comparison group allows for a meaningful assessment of the impact. In total, therefore, a period of 2.5 years passed between the start of implementation in May 2016 and the start of the endline survey in October 2018. In the context of a program aimed at changing behaviours like diets and child feeding that are affected by cultural norms through the provision of information alone, this implementation period could be viewed as being too short to expect substantial change. In addition, given the changes to the intervention components that were described above, the effective period of implementation was even shorter, often considerably so.

Overall, the samples were well balanced at baseline, despite the small number of evaluation clusters. Attrition of the sample was tracked carefully at endline. The attrition rate was only 5.6 percent, which is low relative to other panel surveys. The most common reasons for attrition among the respondents were migration for work, permanent relocation, temporary absence from the village, and death.

The data analysis presented in this report has four components:

- Contextual data, drawn from the household and community surveys, intended to ground the results in the study context and attrition analysis, to compare baseline characteristics of households we were able to re-interview to those we were not.
- Impact estimates, using ANCOVA models for those outcomes we measured at both baseline and endline, and single-difference for the remaining outcomes.
- Delivery and exposure summary statistics, to triangulate changes in the delivery of the intervention and the household-level exposure to treatment, explain the impact estimates.
- Cost estimates of implementing the JEEViKA-MC pilot using an adapted ABC-I method (accounts for program costs from inputs, input quantities and input unit costs), to better understand the costs involved in engaging SHGs to improve health and nutrition outcomes

Evaluation findings

Do the JEEViKA-MC interventions lead to improved nutrition outcomes when compared to the basic JEEViKA intervention?

The intervention did not impact women's nutritional status as measured by body mass index. For children, we find positive and significant impacts of the intervention on the number of food groups consumed for both the index child and for the youngest child.

Women's body mass index. At baseline, the average BMI among respondent women was 19.07 (±2.3), and about 44 percent of the women were underweight. The endline estimates of the impact of the JEEViKA-MC treatment show no impact of the treatment on women's BMI, regardless of specification. The impact estimates were negative but insignificant in all cases.

Child reported dietary diversity (index children and youngest children (at endline)). The baseline reported dietary diversity among *index children* was poor, with only 25.9 percent overall achieving

minimum dietary diversity (reported) and very few consuming flesh foods, eggs, or vitamin A–rich fruits and vegetables. We find positive and significant impacts of the treatment, with an increase of 0.17 (0.08) in the total number of food groups consumed. This amounts to a 4.4 pp increase over the baseline comparison arm mean of 3.88 food groups.

The increase in reported dietary diversity among the index children seems to be driven by the increase in the proportion of children consuming vitamin A–rich fruits and vegetables and other fruits and vegetables. Although there was a large increase in the proportion of children consuming pulses, this increase is similar across the two intervention arms. Despite 82 percent of index children reported by their mothers as being non-vegetarian, consumption of flesh foods and eggs was very low. We acknowledge that taboos and cultural norms around feeding flesh foods and eggs to children exist in these areas, especially for those children just transitioning to complementary feeding. However, the modal age of the index child at baseline and endline was 14 and 44 months, respectively, suggesting that the low levels of consumption may not have not driven by the age of the child. It is possible that the taboos persist despite the provision of information on diets. It is also possible that limited resources pose a serious constraint on adopting recommended behaviors, as eggs and flesh foods are typically more expensive than vegetables and pulses.

For the *youngest child* aged 6–23 months at the time of the endline, we find a positive and significant increase of .29 (0.12) in the number of food groups consumed by those in the treatment arm as compared to the comparison arm. This amounts to an 8.5 pp increase over the endline comparison arm mean. We did not find any significant impact of the treatment on the proportion of youngest children attaining minmum dietary diversity (reported). However. across both arms, the average proportion of youngest children who achieved minimum dietary diversity (reported) at endline was high at 58.3 percent, a huge improvement over 22.6 percent among comparison-arm index children at baseline.

Do the JEEViKA-MC interventions improve health, hygiene, and nutrition knowledge and practices of SHG members and mothers of young children compared to the basic JEEViKA intervention?

The impact evaluation demonstrates that the intervention was successful in positively changing some key knowledge and practice indicators, especially those related to reported dietary diversity, and in improving women's diets. Notably, the significant improvements in knowledge around child feeding, dietary diversity and kitchen gardens, key intermediate steps toward improving diet quality for mother and child, align with the improvements in dietary quality observed for women and children in the treatment arm. In terms of IYCF practices for the youngest child, the introduction of solid, semi-solid or soft food and continued breastfeeding were found to improve substantially, but no other core or optional indicators showed improvement. Among health practices affecting the index child, only the likelihood of the child receiving oral rehydration salts (ORS) during diarrhea was found to improve. The youngest child was also more likely to receive ORS. In terms of antenatal practices, consumption of iron–folic acid (IFA) tablets and calcium tablets improved for pregnant women (mothers of the youngest child) in the treatment arm. For several practice indicators, relatively high levels of baseline adoption meant that there was little room for improvement, so the lack of significant results is unsurprising. There was no impact on anthropometric outcomes and morbidity among children, or on household food security.

Dietary diversity

Women's diets. At baseline, less than a third of the women reported diets that met standards for minimum dietary diversity, defined as consuming at least 5 out of the 10 food groups. Average reported dietary diversity among respondent women was a little less than 4 food groups. By the time of the endline survey, the proportion reporting having achieved minimum dietary diversity showed an impressive increase in the treatment arm as compared to the comparison arm. We find a 10.3-percentage

point (pp) increase in the likelihood of a woman in the treatment arm consuming 5 out of 10 food groups, which represents a 30 percent increase over the baseline comparison levels. Among women in the treatment arm at endline, the average woman's reported dietary diversity score increased by 0.3 food groups, a 7.8 percent increase over the baseline comparison group mean. Similar to the results for the index child, women's increased consumption of pulses, dairy, and other fruits and vegetables drove this change, with little improvement in flesh foods or eggs and a decline in consumption of dark leafy greens in both arms.

These results suggest that further improvements in diets are possible through reinforced messaging around animal-sourced foods and dark leafy greens. However, as for children, although 77 percent of women reported that they are nonvegetarian, a much smaller proportion reported having consumed flesh foods or eggs in the previous 24 hours, suggesting that providing information about these foods may not have a large effect because resource constraints or cultural norms may be restricting their consumption.

Knowledge

One of the key secondary outcomes measured was women's knowledge around the content of the behavior change communication. At endline, the treatment arm scores higher than the comparison arm in knowledge on all subdomains of knowledge on health, hygiene, and nutrition, as well as overall. The largest differences are seen in knowledge on child feeding, reported dietary diversity, and services provided by frontline workers. However, the differences between arms are not large, and even the comparison arm scores a 73 (out of 100) on the overall knowledge test. To further investigate the impact of the treatment on these knowledge scores, we group the knowledge into three bins—miscellaneous topics (sanitation, maternal health and services provided by FLWs), child-related, and diet-related. We find statistically significant impacts on several aspects: knowledge of services provided by the FLWs (4.7 pp increase over endline comparison mean), knowledge on child feeding (6.6 pp increase over endline comparison mean), knowledge of dietary diversity (4.9 pp increase over endline comparison mean), knowledge on kitchen gardens (2.3 pp increase over endline comparison mean). The areas where knowledge of the women in the treatment arm has significantly improved accords with the impacts reported above on child and adult women's diets.

Practices

Improved health practices. Overall, there appears to be some improvement in health practices relating to both the index child and the youngest child. For the index child, we find a 7.2 percentage point increase in the likelihood that the mother gave ORS when the child had diarrhea, but no impacts on the use of Village Health Sanitation and Nutrition Days by the mother or the child.

For antenatal care practices when pregnant with the youngest child, we find no impact of the pilot on the likelihood of the pregnancy being registered with a health worker, or that the birth was in a health facility. This is perhaps unsurprising given that coverage of these services was high even in the comparison arm, leaving little room for improvement. Among comparison arm mothers, 99 percent registered their pregnancy and 83 percent of them gave birth in a private or government health facility. We also do not see any impact on the number of times antenatal care was provided during pregnancy.

We see some encouraging impacts of the pilot treatment on the consumption of IFA and calcium tablets during pregnancy with the youngest child. The number of IFA tablets consumed increased significantly by 10, a 38 percent increase over a comparison arm mean of 25 tablets. We also see a 5 pp increase in the likelihood that the mother received calcium tablets, a 50 percent increase over the comparison arm mean. Finally, we see sizeable and significant impact of 2.8 pp increase in the number of days for which calcium tablets were consumed, which is a 90 percent increase over a comparison arm mean.

For the youngest child, we find no impact of the pilot on participation in the Village Health Sanitation and Nutrition Day in the 3 months prior to the survey, or on the likelihood of the child having an immunization card. The insignificant result on immunization card is likely because of the high levels of adoption even in the absence of the intervention, with 90 percent of the children in the comparison arm reported as having a health card. We do, however, see sizeable and significant impacts of the pilot on treatment of diarrhea for the youngest child – there is an 9 pp increase in the likelihood that the mother gave ORS when the youngest child had diarrhea, which is a 26 percent increase over the endline comparison mean.

Some of the improvements in health practices, such as the increase in the consumption of IFA tablets and receipt of calcium tablets, are also dictated by the supply of these services, and not solely by mothers' demand. It is possible that the convergence component of the pilot is responsible for strengthening service delivery in these areas.

Hygiene and sanitation practices, including handwashing and use of latrines. The proportion of households that use correct materials to wash hands and have an improved drinking water source is quite high, however, few households correctly dispose of children's stools (<30%) or treat water to make it safe to drink (<5%). The treatment arm does better than the comparison arm on several of these indicators, though differences are small. When examining hygiene and sanitation practices, we find no significant impacts of the treatment except in correct handwashing practices, where the impact is small.

Infant and young child feeding practices for the youngest child under 2 years. The core IYCF indicators include early initiation of breastfeeding, continued breastfeeding at 1 year, introduction of solid, semi-solid or soft food, minimum dietary diversity (reported), and consumption of iron-rich food. We find no impact of the pilot on early initiation of breastfeeding or continued breastfeeding at 1 year, however, both practices are reasonably widespread even among women in the comparison arm. Among the optional IYCF indicators, the pilot does not appear to have had an impact on the likelihood of the child being ever breastfed, but we do see an impact of 13.2 pp on the likelihood of continued breastfeeding at 2 years, which amounts to an increase of 17 percent over the comparison arm mean. We also find a large and significant impact of 36.3 percentage points on the introduction of solid, semi-solid or soft food, a 57 percent increase over the comparison arm mean. No impacts are observed on the achievement of minimum dietary diversity (reported) or the consumption of iron-rich food.

Anthropometry, morbidity, and food security

Anthropometric outcomes among children. No impact of the pilot intervention is found for anthropometric indicators (height-for-age, weight-for-age and weight-for-height Z-scores) for the index child. Stunting, wasting and underweight were not different across arms either at baseline or endline. Overall, the proportion of children stunted increased substantially between baseline and endline in both groups. Since these are the same children followed 2.5 years later, this might be the result of the growth faltering that is often seen with increasing child age.

There was no impact of the pilot on childhood wasting or underweight for the index child in the regression-based impact models either. There is a small increase of 0.04 (0.02) in the likelihood of the index children in the treatment arm being stunted at endline, a 7.7 pp increase over the baseline comparison arm mean. However, this effect is significant only at the 10 percent level in the full model. The intervention had no impact on anthropometric outcomes among youngest children (6–23 months) at the time of the endline survey.

Morbidity among children. There was no impact on fast breathing or cough in the two weeks prior to the survey. We do find a small positive impact on the incidence of diarrhea among index children (point

estimate of 0.05 (0.03)) and in fever among younger children (point estimate of 0.06 (0.03)), however, these are significant only at the 10 percent level.

Household food security. There was no impact of the intervention on households' experience of food insecurity (as measured by the Household Food Insecurity Access Scale (HFIAS)). At baseline, more than 40 percent of the households in both arms experienced food insecurity, indicating that this population is highly food insecure. The proportion of households reporting the most extreme form of food insecurity—insufficient food intake or quantity—declined in both arms by endline. However, those reporting food-related anxiety, uncertainty, and insufficient quality increased in both arms by the endline.

Do the JEEViKA-MC interventions increase utilization of government health, nutrition, and sanitation programs as well as JEEViKA food security-related services?

Overall, the pilot does not appear to have significantly improved awareness or use of three important government schemes for health, nutrition and sanitation. The pilot also did not affect awareness or use of several core JEEViKA platforms, including participation in the SHGs and related savings and credit activities, or the Health Risk Fund, meaning that the pilot did not alter the functioning of the basic platform. However, in line with expectations from the nutrition-focused adaptations in the treatment arm, SHGs in the pilot did discuss health and nutrition issues more frequently. Women in the treatment arm were more likely to have been exposed to key health- and nutrition-related messages, and having heard the message, more likely to have adopted the practice. Women in the treatment arm were also more likely to have kitchen gardens.

Awareness and use of government programs. There was no impact on awareness of three government programs targeted towards pregnant and lactating mothers—Janani Suraksha Yojana (JSY), Janani Shishu Suraksha Karyakram (JSSK), or Pradhan Mantri Matritva Suraksha Yojana (PMSMA)—or on knowledge of the benefits of these schemes. Overall, awareness was high for Janani Suraksha Yojana but lower for Janani Shishu Suraksha Karyakram and very low for Pradhan Mantri Matritva Suraksha Yojana, indicating that strengthening community awareness is a key area for further work. There was also no impact on the likelihood of mothers receiving any benefits from these schemes. Likewise, there was no impact on child enrollment in the Anganwadi center; current attendance or attendance at the Anganwadi Center in the last 12 months; or of the mother receiving take-home rations for herself or her child.

Exposure to the core JEEViKA platforms. Part of the focus of the MC pilot was on strengthening awareness and use of the core platforms provided by JEEViKA, especially the use of funds for health and food security. For these core platforms—SHGs, savings and credit activities within these groups, loans given by the SHGs, and use of the Health Risk Fund (HRF)—there is no significant difference between treatment and comparison arms. This is reassuring, as it indicates that the pilot did not improve basic program activities in the treatment arm at the cost of the comparison arm. For the Food Security Fund, which was promoted under the pilot, we find that the treatment arm was more likely to have received food from the Fund.

SHGs in the treatment arm discuss health- and nutrition-related topics with greater frequency. The only topics that do not differ across arms, in terms of the share of women reporting discussions, are savings and credit and personal issues, as should be expected.

Kitchen garden cultivation, a core JEEViKA intervention but one that was additionally promoted in BCC sessions, is reasonably widespread at the time of the endline. Women in the treatment arm were more likely to have ever had a kitchen garden, though comparison arm women had had them for longer. Other encouraging positive differences were observed across arms—an increase in the likelihood that

the household currently has a kitchen garden and the current kitchen garden is cultivated year-round over the endline comparison mean levels. Resources do not appear to have been a serious constraint to planting and maintenance of kitchen gardens, but the provision of information regarding cultivation needs to be improved. Notably, 36 percent of women in the treatment arm had not received any information about these gardens.

Exposure to other JEEViKA-MC interventions. Pilot-specific activities—video screenings, home visits, community events and health/nutrition services received at these community events—are all more likely to have occurred in the treatment arm Gram Panchayats. Notably, exposure to key health and nutrition messages promoted in the pilot was higher in the treatment arm. Conditional on having heard the message, a high proportion of women tried the practice being promoted, and a high proportion adopted the practice. This indicates that the provision of information is the primary barrier.

What did the nutrition interventions cost to implement?

This is one of only a few studies to estimate the cost of implementing a nutrition BCC intervention using SHGs as a delivery platform. We used an adapted ABC-I method, which accounts for program costs from inputs, input quantities, and input unit costs, to estimate the costs of implementing the JEEViKA-MC pilot. Focus group discussions with program staff and key informant interviews with program staff, implementers, and managers at the state, district, and block level provided understanding of the activities included in each of the two intervention components (BCC and the convergence and coordination component). Cost data were collected across seven categories—BCC materials, training, staff time, delivery-related, convergence and coordination-related, monitoring, and administrative costs. We also collected information on the total number of SHGs, women within these SHGs, and the target beneficiaries—defined as pregnant women and mothers of young children—reached in each block.

The total cumulative cost of implementing the pilot was approximately US$420,354. About 25 percent of this total was spent on overall project activities (those that cannot be attributed to only BCC or convergence and coordination), the BCC component accounted for 71 percent, and the Convergence and coordination accounted for 5 percent. The total cost per SHG was $264, cost per target beneficiary was $110, and the cost per SHG member per meeting was $0.49.

More than 44 percent of the total cost is accounted for by the upfront costs of the feasibility phase. Excluding those costs results in a cost of $148 per SHG, $62 per beneficiary and $2.75 per SHG meeting.

Recommendations

Our findings, both from the impact evaluation and the process evaluation, have implications for the design and implementation of similar programs, including those supported by the National Rural Livelihood Mission. The main recommendations for programs of this nature can be distilled as follows: leverage the SHG platforms for reach, but simplify the intervention components, streamline the content of any BCC to focus on messages that have a wider applicability and perhaps, in early efforts, focus on those behaviors that can be changed easily with resources already available to household. Even with these adaptations, however, it might be too optimistic to expect that simply providing information and social mobilization can change outcomes for women living in conditions as challenging as those in Saharsa, especially for a short-lived intervention tackling deeply entrenched behavioral patterns.

Leverage the SHGs for reach. The basic platform—the SHG—seems to be working effectively. Women in the treatment arm are discussing nutrition-related topics at SHG meetings, which suggests the pilot intervention was effective at integrating this content into the ongoing SHG meetings. Additional pilot-specific activities, such as community events and Digital Green videos, also appear to have been implemented. As a result, exposure to key nutrition-related messages among women in the

treatment arm is significantly higher than among women in the comparison arm. This implies that the basic approach and design have the potential to be successfully leveraged for impact. *Other programs, such as those under the larger NRLM umbrella, should consider integrating nutrition as a key discussion topic where their core platforms are working well.*

Streamline the BCC component and increase relevance for SHG audience. Although the content of the BCC material was comprehensive, we observe positive change only for a few knowledge indicators and behaviors. The BCC content—which was heavily targeted to pregnant women and mothers of young children—was not always appropriate for the average SHG woman, who is typically older and past her key fertility phase. In addition, many topics were covered in a tight timeframe, and there was no opportunity to reiterate or reinforce key messages. The BCC might have been more effective if the content had focused on a few key areas (deemed most essential based on some formative research) that were relevant to *all* women who attend SHG meetings. Dietary diversity and food security are two examples of such content. Tighter focus of the content would likely have helped drive home certain behaviors. *In scaling this approach into other programs under the NRLM umbrella, a key recommendation is to choose a few focus behaviors such as improving dietary diversity for all family members. These are relevant behaviors for all SHG members, regardless of age or stage of life, and could get greater traction and salience than behaviors focused on nutrition practices relevant only at certain points in the lifecycle.*

Limit changes in the intervention components to facilitate focus. As highlighted in the process evaluation and described in brief above, the JEEViKA-MC interventions and components within them were frequently adjusted, adapted, and changed. This flexibility and the ability to adapt to program and community conditions is important in the initial period of any pilot, however substantial changes were observed even in the second year of implementation. Frequent changes to intervention components may have contributed to confusion among those implementing on the ground *and* to delays in rollout of specific components, which in turn may have limited the potential for impact of these components.

Understand and address the multiple barriers to behavior change. We find that knowledge increased without commensurate improvement in behaviors or practices. This may be explained in part by the short time period in which the pilot was operational (behavior takes time to change, knowledge changes much faster). But it is important to recognize that knowledge about optimal behavior is a necessary—but not sufficient—condition for adoption of these optimal practices. There can be multiple barriers to adoption, such as availability, access (which includes affordability and agency), buy-in from the households, especially male members who are not part of the SHGs, and, perhaps most importantly, social and cultural norms. *The implications for other NRLM programs are to consider coupling the nutrition behavior change with actions to support income generation activities or to build linkages with other programs addressing underlying contextual factors such as food security and poverty.*

Addressing these barriers will require complementary investments and uptake of government services. For example, high levels of underweight persist among women despite an increase in awareness and uptake of the Food Security Fund, suggesting that the quantity and quality of food received is insufficient to reduce the prevalence of underweight among women. Improving women's well-being will likely require additional tangible inputs to improve food security, incomes, or women's workloads, all of which could contribute to underweight among women. Likewise, although reported dietary diversity improved for women, more than half of women even in the intervention area do not report meeting minimum dietary diversity thresholds, suggesting more efforts are needed to remove barriers to consumption. The lack of impact on child wasting and underweight and anthropometric scores of children is consistent with other studies in poor settings that included only BCC. Improvements in child nutrition, as for women's nutrition, could require additional accompanying interventions such as food or cash assistance. At the household level too, the lack of impact on food security suggests that financial

or other resource constraints related to food availability and quality are critical concerns. Achieving greater impacts on diet quality will require complementary approaches to improve basic food security.

In other areas, increased knowledge alone provided through the SHGs could improve behavior. A few messages were heard by more than 70 percent of the women—handwashing practices, washing vegetables before cutting, and exclusive breastfeeding. Conditional on hearing a message, the proportion who tried the practice and who adopted the practice is very high, suggesting that in these cases, provision of information is the major barrier to be addressed. This suggests that increased knowledge could address the low use of ORS and practices related to stool disposal and drinking-water treatment.

Conclusions

This impact evaluation has demonstrated that a nutrition-focused adaptation to the base JEEViKA livelihoods and community engagement platform, as implemented in the JEEViKA-MC pilot, had small but significant impacts on reported dietary diversity of women and children, but not on anthropometric outcomes for either women or children. The intervention worked through anticipated pathways, delivering higher exposure to key messages on nutrition through the self-help group platform, and contributing to improved knowledge about nutrition. It also did so without disrupting the base activities of the program. Impacts were also seen on several health and nutrition practices among women covered by the pilot program. There were no impacts on utilization of government programs but women in the pilot were more likely to have kitchen gardens.

We conclude it is possible to leverage the reach of the SHG platform for improving nutrition, but that focus is critical and that accompanying efforts to address resource constraints are needed to support effective translation of knowledge into sustained improvements in the diets and well-being of the women and children in these poor communities.

1. INTRODUCTION

Despite the interest in using self-help group (SHG) structures to deliver social development outcomes, the majority of research to date has focused on the effectiveness of SHGs to deliver on their primary goals of financial intermediation, livelihood development, and women's empowerment.[1] The evidence on social development outcomes is largely focused on the externalities of the core SHG model on (for example) health outcomes (e.g., Saha et al. 2013) rather than on the layering of social development interventions onto SHGs. While there are many ongoing evaluations of the SHG model in India, including in Bihar by the Social Observatory of the World Bank (and others), evidence of the potential for SHGs to deliver improved nutrition outcomes is far more limited. There are a handful of ongoing or recently completed evaluations that focus on health: for example, the evaluation of Parivartan by the Gates Foundation, which looks at maternal health; the evaluation of Gram Varta by 3ie, which is also focused on health; and one part of the Social Observatory evaluation of JEEViKA in Bihar that looks at related outcomes such as food security, though not at nutrition. A recent evidence review documenting the impact of programs based on women's groups on maternal and child nutrition outcomes in South Asia concludes that although these programs have the potential for impact, the evidence base is thin and few studies examine the pathways to impact (Kumar et al. 2018). The evaluation of the randomized controlled trial (RCT) described in this document aims to add to the body of literature studying the use of the SHG model to support nutrition objectives, and to do so in a context well suited to such a study—one where the SHG model is widespread and receives extensive state support, but where health and nutrition outcomes are poor. We anticipate that lessons learnt from this evaluation can be used to strengthen the design of programs of this nature across Bihar and in other, similar contexts.

1.1 The JEEViKA-MC Pilot Intervention

The JEEViKA Multisectoral Convergence Model (JEEViKA-MC), piloted in 12 Gram Panchayats of Saharsa, Bihar, was developed by the Bihar Rural Livelihoods Promotion Society with technical support from the World Bank, and aimed to address the immediate and underlying determinants of undernutrition among women and children. These determinants typically cut across sectors. The pilot aimed to leverage the women's SHG platform to address these determinants through two sets of interventions that complemented each other, and which were layered onto the existing core package of JEEViKA activities. These interventions (described in detail below) were targeted to women who were members of the SHGs formed by JEEViKA in the study areas. JEEViKA typically targets women belonging to poor households (HH) to improve their livelihoods and enhance their HH incomes. Within this target population, HHs with young children, mothers of young children, and pregnant women were the special focus under JEEViKA-MC.

The core set of JEEViKA interventions includes the organization of rural women into SHGs, the training and strengthening of the SHGs, federations of the SHGs into Village Organizations and Cluster-Level Federations, bank linkages for the SHGs and their federations, the improvement of livelihoods and hence of household income, and the empowerment of women through their increased economic contributions.

Additional JEEViKA-MC components were layered onto the core set of JEEViKA interventions and consist of two distinct parts.

- **Component 1, Promoting Household Behavior Change**

[1] See, for example, the Campbell Systematic Review, "Economic Self-Help Group Programs for Improving Women's Empowerment: A Systematic Review," by Brody et al. 2015.

Intensive behavior change communication (BCC) was provided by the JEEViKA cadre of Community Mobilizers (CMs), who were trained to deliver messages on maternal and child nutrition and health, water, sanitation, and hygiene behaviors at bi-monthly SHG meetings. The BCC focused especially on HHs with women of reproductive age and young children and was accompanied by community monitoring and support by community workers and other SHG members. While the CMs were part of the JEEViKA program in all areas, they provided health and nutrition BCC only in the 12 treatment Gram Panchayats that were part of this evaluation.

Content of the BCC messages

The BCC messages focused on a range of topics including maternal, infant, and young child feeding practices; diets during pregnancy; early initiation and exclusive breast feeding; timely and appropriate complementary feeding; antenatal and postnatal care; awareness of the benefits of iron-folate supplementation and vitamin A supplementation (for children); institutional delivery; routine immunization; Integrated Child Development Scheme (ICDS) entitlements such as supplemental food; ways of improving household food security through improved use of JEEViKA's Food Security Fund (FSF); use of government entitlement schemes that can improve health, nutrition, or food security (e.g., the Public Distribution System [PDS] and the Janani Suraksha Yojana [JSY]); the adoption of kitchen gardens; and the importance of safe water, sanitation, and hygiene practices, including use of latrines. Recipients of the BCC were also made aware of the Health Risk fund (HRF) that individual SHG members can access to finance medical treatment.

The CM was also responsible for the dissemination of a series of videos on health and nutrition developed by Digital Green, starting in June 2017. CMs in the treatment areas were provided with pico-projectors and a series of six videos to be shown to community members. These videos touched upon several topics, such as the importance of kitchen gardens, how to prepare oral rehydration salts (ORS), different food groups and the importance of dietary diversity, and the need for good hygiene.

Finally, the BCC delivered by the CM was to be complemented by targeted home visits, peer group meetings, and community events to be organized by the Health Sub-committee (HSC) members. These Health Sub-committee members—consisting of three women per Village organization—were trained on health and nutrition by health Community Resource Persons (CRPs), and by the World Bank team in Saharsa, and were intended to operate on a volunteer basis. The Health Sub-committee members were also tasked with administering individual and community level monitoring tools at the time of the home visits. The tools were different for pregnant and lactating women, and asked questions relating to the BCC-recommended health and nutrition practices. The individual monitoring tool was intended for women to track their own nutrition, with particular focus on their diets.

The theory of change regarding the first component is depicted in Figure 1.1 (for a full description of the various pathways depicted therein, see Raghunathan et al. 2017a).

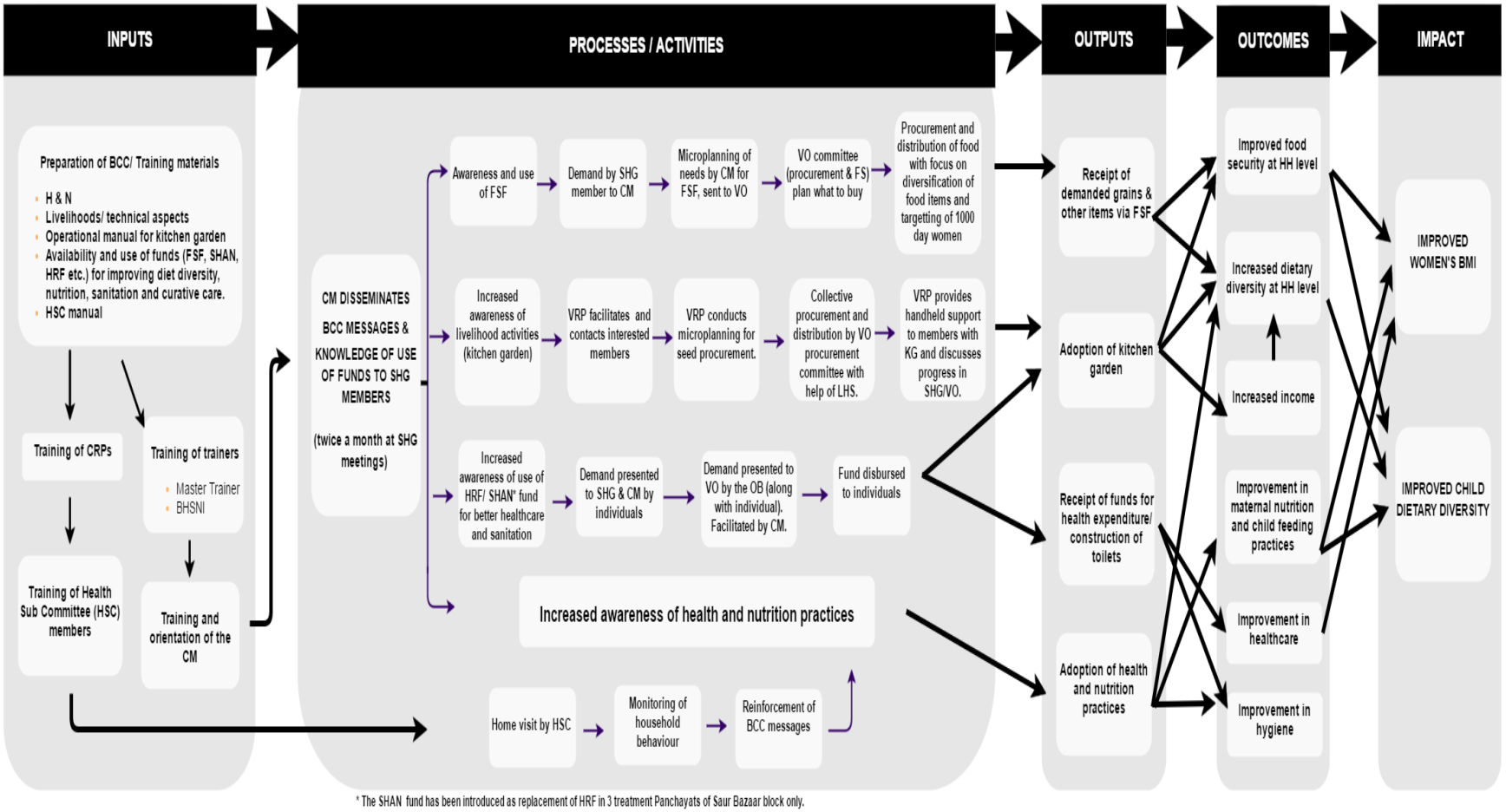

Figure 1-1.1 Program Impact Pathway for Promoting Household Behavior Change

- **Component 2, Strengthening Convergence to Improve Access and Utilization of Key Public Services**

This component was envisaged as strengthening the supply side to meet the growing demand for health and nutrition services generated through increasing awareness at the household level. At the time of the design of the pilot, this component consisted of convergence and coordination committees at the Gram Panchayat, block, and district levels, comprising representatives from several departments, including (a) Integrated Child Development Scheme for nutrition services; (b) National Rural Health Mission (NRHM) and District Health Society for health services; (c) Public Health Engineering Department (PHED) and Rural Development (RD) Department for sanitation services; (d) Krishi Vigyan Kendras (KVKs, farm science centers) and Horticulture Department for agriculture services; and (e) Panchayati Raj Institutions (PRI) for local governance issues. These committees were scheduled to meet once a month. Issues related to service provision at various levels (e.g. lack of IFA tablets in an Anganwadi Center) could be raised at the committee at the appropriate level (say the Gram Panchayat) and escalated through the hierarchy of committees as needed until a solution had been implemented. By bringing together all relevant parties these committees hoped to provide swift and transparent resolution of supply-side issues.

The date of order for the formation of the district-level convergence committee was July 2016, and for the panchayat and block-level committees was between October 2016 and January 2017. However, it was soon found that convening monthly meetings with representatives of so many different departments was time consuming and occasionally impossible, resulting in meetings being held very infrequently (Raghunathan et al. 2017a). In July 2017, support for the formation of these committees was finally withdrawn.

Alongside the formation of these convergence committees, the pilot also aimed to strengthen existing government platforms. Several specific platforms—the Bachpan Diwas, the Annaprashan Diwas, and the Village Health Sanitation and Nutrition Day (VHSND), designed to be held monthly at the Anganwadi Center—had already been instituted in all areas but were either non-functional or minimally functional before the start of this pilot. In the treatment areas, special attention was given to reviving these platforms, which were to be used to reinforce the BCC messages and to promote convergence between the Health Sub-committee, CM, and the health and Integrated Child Development Scheme frontline workers (FLWs). The Annaprashan Diwas and involvement with the Village Health Sanitation and Nutrition Day were integrated into the pilot in May 2016, and the Bachpan Diwas in August 2016. Over time, however, it was found that these events were not being held at the intended frequency, nor were the intended services being provided (Raghunathan et al. 2017a), and the support to these events diminished.

At the time of the endline survey, Component 2 consisted of means to strengthen convergence across health and nutrition service providers at the village level. The pre-existing but largely defunct Village organization level Health Subcommittee, a 3-member volunteer committee of women, was trained to improve convergence and coordination efforts among these departments by assisting government FLWs like the Anganwadi worker, the Accredited Social Health Activist, and the Auxiliary Nurse Midwife in their duties. In addition to these points of convergence, there was an attempt to revive and strengthen other institutional mechanisms like the Village Health Sanitation and Nutrition Committee (VHSNC) and village-level monitoring committee, Health Sub-center meetings, and Village organization meetings.

Figure 1.2 presents the theory of change for the second component of the intervention. Again, for a detailed description of the various pathways, please refer to Raghunathan et al. 2017a.

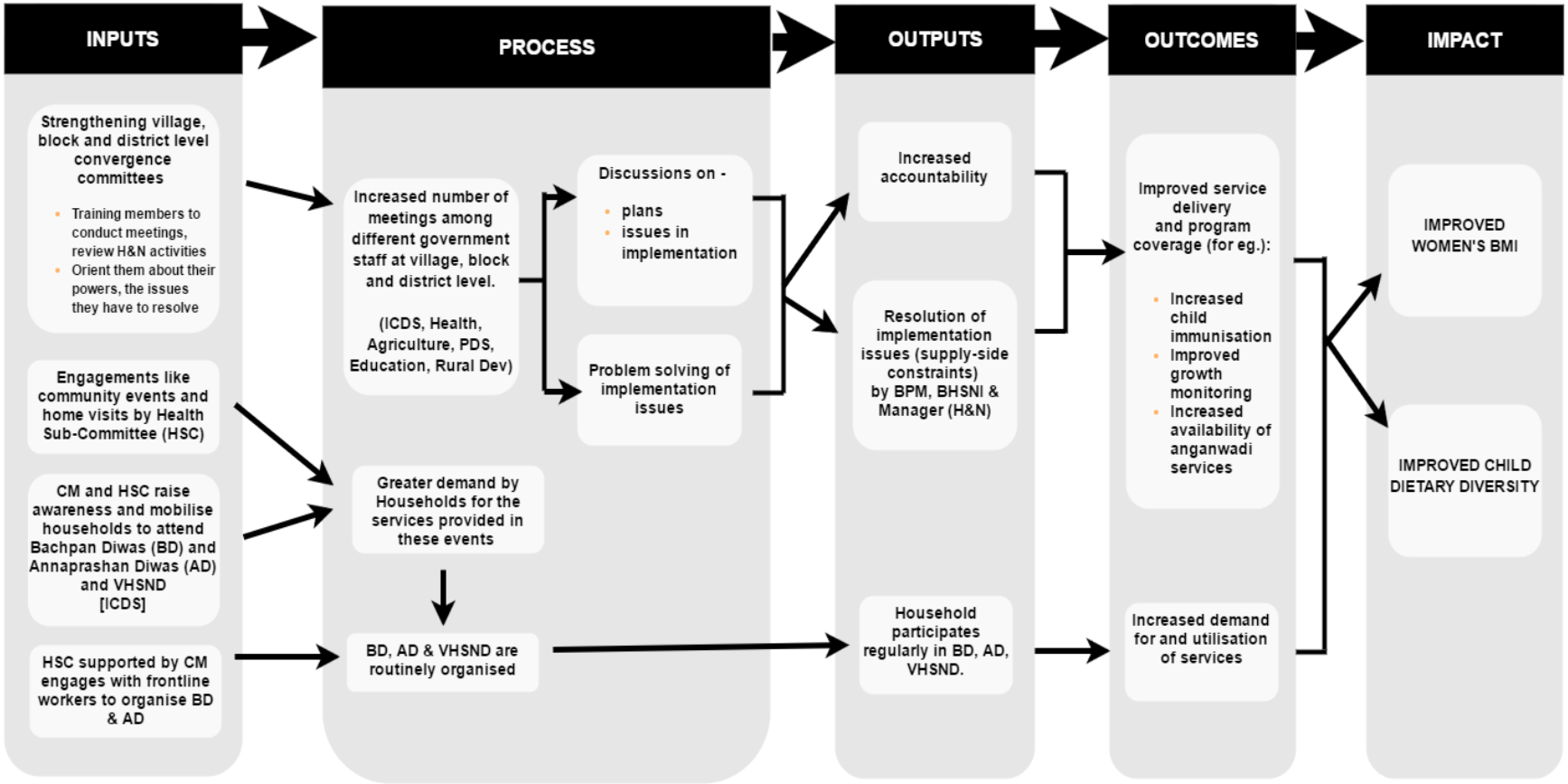

Figure 1.1-2 Program Impact Pathway for the Convergence Component

Given the two components described above, the purpose of the JEEViKA-MC pilot intervention can be distilled as follows:

1. To promote nutrition, health, water, and sanitation awareness, and actions leading to improvement in maternal and child nutrition, health, hygiene, and sanitation practices.
2. To improve household food availability of a diverse food basket, with particular focus on the 1,000-day window of opportunity.
3. To increase demand and utilization of services through coordination and collaboration between community and local service providers from concerned health, nutrition, and sanitation programs.

Following the learnings from the feasibility phase that was held from March 2014 to December 2015, the JEEViKA-MC pilot was introduced in 12 Gram Panchayats of Saur Bazaar, Sonbarsa Raj, and Pattarghat blocks of Saharsa district in July 2016.

Community Mobilizers and their role in the BCC delivery

Community Mobilizers (CMs) are a JEEViKA cadre of workers, recruited from the communities they serve. They are women, often themselves SHG members, and need to have passed grade 8. Their main responsibility within the JEEViKA system is that of maintaining the books for the SHGs they work with. Each CM covers about 12-15 SHGs, all located within a short distance of her own home. She is expected to attend SHG meetings, and to record in her ledgers all savings and credit transactions made – who has donated money to the central pot, who was loaned money, who repaid a loan and with how much.

When the JEEViKA-MC pilot was first designed and tested in its feasibility phase, the role of disseminating health and nutrition BCC was assigned to another cadre of women, known as JEEViKA Sahelis (*saheli* means 'friend' in Hindi). However, it was deemed infeasible to retain an entire cadre of workers specifically for this purpose, so after the feasibility phase was completed, it was decided that the CMs in the treatment arms would take on the additional responsibility of the BCC delivery.

CMs therefore receive two types of trainings. The first is training on their responsibilities as bookkeepers for the SHGs – all CMs receive this. The second is the training on the BCC content and delivery – only CMs in the treatment arm receive this. Under the pilot guidelines, the CMs in the treatment area are to receive an additional incentive for each health and nutrition BCC session conducted, over and above their basic salaries for the bookkeeper work. Each health and nutrition BCC session on a particular topic is designed to take about an hour to deliver. During the process evaluation we conducted close to 30 observations of SHG meetings and found that actual discussions on health and nutrition only last for about 10 minutes. The rest of the meeting time is spent waiting for women to gather, maintaining records, and conducting tasks for other schemes, e.g. life insurance schemes or sanitation drives.

Finally, the addition of video dissemination in collaboration with Digital Green was a component introduced about a year into the intervention. Here, videos on six different topics were prepared, and the CM was given a pico projector and training on how to screen the videos. Videos were screened in a public place, e.g. on the wall of the school or Anganwadi center and these screenings were attended by members of the community. Since this required an additional visit to the villages in the evenings, the CM was to receive a monetary incentive for this video work as well.

1.2 Evaluation Objectives and Key Outcomes

To assess the impact of the JEEViKA-MC pilot, the International Food Policy Research Institute (IFPRI) and the World Bank designed a randomized controlled trial in 2015. Designed as an effectiveness trial, the findings from this impact evaluation study were intended to inform the potential scale-up of the JEEViKA-MC pilot program (and of other health and nutrition BCC programs like it) both within and outside Bihar.

Our evaluation aimed to answer the following questions:

- Do the JEEViKA-MC interventions lead to improved nutrition outcomes, as measured by improved body mass index (BMI) of women of reproductive age when compared to the basic JEEViKA intervention?
- Do the JEEViKA-MC interventions improve health, hygiene, and nutrition knowledge and practices of SHG members and mothers of young children compared to the basic JEEViKA intervention?
- Do the JEEViKA-MC interventions increase utilization of government health, nutrition, and sanitation programs as well as JEEViKA food security-related services?

To address these research questions, the key primary and secondary outcomes assessed in this study were as follows:

Primary outcomes

- Women's BMI
- Dietary diversity for children ages 6–23 months

Secondary outcomes

I. Woman:

- Dietary diversity
- Health, hygiene, and nutrition knowledge and practices

II. Child

- Anthropometry (height-for-age; weight-for-height; weight-for-age Z-scores; stunting; wasting; and underweight) among children ages 6–23 months
- Infant and young child feeding (IYCF) practices for children ages 6–23 months
- Morbidity among children under the age of 6–23 months

III. Household

- Household food security measured by the Household Food Insecurity Access Scale (HFIAS)
- Utilization of government programs, as well as JEEViKA food security-related services.
- Hygiene and sanitation practices, including handwashing and use of latrines

1.3 Structure of the Report

The rest of the report is structured as follows: Chapter 2 discusses the study design, the sample, and data collection; it then describes the impact evaluation methodology. Chapter 3 presents data from the baseline

on the communities in our survey to provide context. It also examines attrition of sample respondent women and index children. Chapter 4 provides the impact estimates on the primary outcomes—women's BMI and child reported dietary diversity. Chapter 5 provides the impact estimates for all the secondary outcomes, at the woman, child, and household level. Chapter 6 triangulates the findings of Chapters 4 and 5 by presenting results on the awareness and use of government schemes, and exposure of households to core and pilot-specific interventions, as well as on the knowledge, trial, and adoption of certain key messages promoted by the pilot. Chapter 7 provides a cost analysis. Finally, Chapter 8 summarizes the report and provides some reccommendations.

2. EVALUATION DESIGN AND METHODS

In this chapter, we describe the evaluation design, data collection, and data analysis methods used in the impact evaluation. These include design of the surveys and the achieved sample size at baseline and endline; a description of the data collection and management process; data analysis methods; and information about ethical review and trial registry.

The impact evaluation was planned to consist of two rounds of panel data from the selected households — a baseline survey conducted in April–May 2016, and an endline survey planned for April–May 2018. In addition to these two rounds of quantitative data collection, a mixed-methods process evaluation (PE) was also conducted in April–May 2017 to provide insight into implementation challenges and to allow for any necessary mid-course corrections.

Because of circumstances outside the research team's control, the endline survey was not conducted at the same time of year as the baseline and was instead moved by half a year to October–November 2018. This change in timing resulted in a seasonality shift, which can influence agricultural outputs and incomes, disease environments, and food availability. However, the comparison with the comparison arm households and over time still permits a meaningful assessment of the impact of this pilot.

Randomization

At the time of study design, only 33 of the 49 Gram Panchayats in the three pilot implementation blocks had mature groups (those with whom work on the core program began in 2011). The remaining Gram Panchayats had had only about one year of core JEEViKA interventions. To maintain comparability, we restricted our attention to the Gram Panchayats with more mature groups, and only excluded 9 Gram Panchayats where Community Health and Nutrition Care Centers (CHNCCs) were present. This left us with 24 Gram Panchayats, from which 12 were selected at random to receive the JEEViKA-MC pilot treatment interventions, and the other 12 Gram Panchayats, were included as controls (Table 2.1). The selection of the Gram Panchayats into the treatment and comparison arms was performed through simple random sampling, conducted by IFPRI in the presence of World Bank staff.

Table 2.1 Distribution of Gram Panchayats into treatment and control groups

Treatment	Control
Barsam, Sonbarsa Raj	Kashinagar, Sonbarsa Raj
Khajuri, Saur Bazaar	Dhabauli South, Pattarghat
Kamp East, Saur Bazaar	Bargaon, Sonbarsa Raj
Khajuraha, Sonbarsa Raj	Chandaur East, Saur Bazaar
Mokma, Sonbarsa Raj	Suhaat, Saur Bazaar
Sahuriya East, Saur Bazaar	Baraith, Sonbarsa Raj
Chandaur West, Saur Bazaar	Golma East, Pattarghat
Pama, Pattarghat	Kanp West, Saur Bazaar
Gamharia, Saur Bazaar	Sonbarsa, Sonbarsa Raj
Rampur, Sair Bazaar	Dhabauli East, Pattarghat
Lagma, Sonbarsa Raj	Rauta Khem, Saur Bazaar
Ajgaiba, Saur Bazaar	Saur, Saur Bazaar

Risk of contamination

Randomization at various levels—the Village Organization, the village, and the Gram Panchayat level—was discussed in light of possible contamination of the comparison arm with the intervention. The initial proposal was to randomly assign Village Organizations into treatment and control groups. However, given that the main change agent for the JEEViKA, the CM, can cover multiple Village Organizations, and Village Organizations can span villages, there was a serious concern of contamination across our treatment and comparison groups. On the other hand, service providers like the Accredited Social Health Activist and Anganwadi workers work at the village level, and thus convergence efforts by the CM could lead to spillovers into comparison areas. Thus, with the agreement of the World Bank and JEEViKA, it was decided that the Gram Panchayat would serve as the unit of randomization.

The choice of Gram Panchayat as the unit of randomization does not preclude the possibility of contamination, however. Gram Panchayats in the treatment and comparison arms could (and in some cases, were) part of the same Cluster Level Federation (a federation of Village Organizations), and so comparison arm SHG executive council members could have been

Sample size estimation

To conduct the power calculations, we used data from a survey conducted by Oxford Policy Management (OPM) in Gaya district in 2011. These data show that the intra-cluster correlation (ICC) for maternal BMI at the Gram Panchayat level is much lower than that observed at the village level. As a result, the power calculations for clustering at the Gram Panchayat reveal minimum detectable difference, and effect size as being much smaller than what is possible for clustering at village level. The power calculations are given in Table 2.2.

Table 2.2 Power calculations using randomization at the Gram Panchayat level

	Gram Panchayat-level randomization		**Gram Panchayat-level randomization (baseline data)**	
Outcome: Maternal BMI	**Power (0.8)**	**Power (0.9)**	**Power (0.8)**	**Power (0.9)**
Number of clusters (per intervention arm)	12	12	12	12
Cluster size	75	75	75	75
Intra-cluster correlation	0.008	0.008	0.008	0.008
Significance level (α)	0.05	0.05	0.05	0.05
Sample size	900	900	900	900
Minimum detectable difference	0.48	0.55	0.45	0.52
Minimum detectable effect size	0.20	0.23	0.20	0.23

Note: basic sample size and power calculation parameters obtained from Oxford Policy Management survey in Gaya, Bihar

Survey sampling

Selection of villages and of women for the household survey was done as follows:

i. We obtained the complete list of villages in each Gram Panchayat within our study.
ii. Five villages were randomly chosen from the complete list of villages in these 24 Gram Panchayats. This gave us 5 × 24 = 120 villages, 60 in each arm. (In cases where there were fewer than five villages per Gram Panchayat, we sampled all villages in the Gram Panchayat and increased the number of households per Gram Panchayat.)
iii. We obtained the complete listing of all households in each of these 120 villages.
iv. From this household listing, we selected 25 households per village that had a woman who satisfied the following criteria:
    - She belonged to a household where at least one woman was a member of a JEEViKA SHG.
    - She had at least one child age 6–23 months.

The sampling of 25 households allowed for oversampling of 5 households per village, to ensure that 20 households per village responded to our survey. This then gave us **20** (HHs per village) * **5** (villages per Gram Panchayat) * **24** (Gram Panchayats) = **2,400** respondents in total: **1,200** in the control and **1,200** in the treatment arm of our study.

The final full study design is depicted graphically in Figure 2-1.

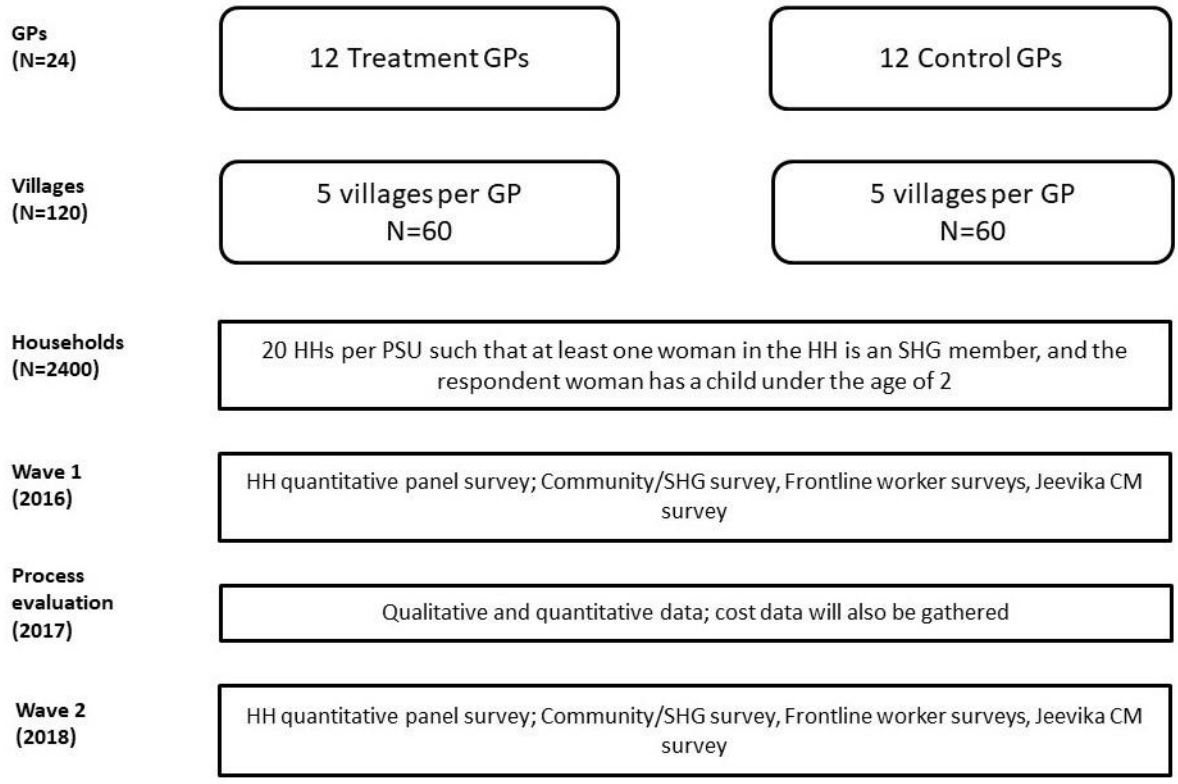

Figure 2-1 Study design

2.1. Survey Respondents

2.1.1. Households

The baseline survey was carried out in 131 villages. We interviewed 2,246 households with respondent women who met the sampling criteria, with 1,164 in the treatment areas and 1,082 in the comparison areas.[2] We measured the height and weight of the respondent woman and all children under two years in the household. At the baseline survey, the youngest child between 6 and 23 months was denoted the 'index child'. The number of index children for whom we collected anthropometric data was 2,246.

At endline, we revisited all 2,246 baseline households and were able to re-interview 2,119 of these (those with baseline respondent women available), for an attrition rate of only 5.65 percent. Anthropometric data were collected for 2,116 respondent women from baseline. The number of index children whose mothers we were able to re-interview was 2,084 (35 were not alive). Anthropometric data were collected for 2,006 index children from baseline.

In addition to the index child, if the mother had given birth to one or more children since baseline, information was collected for the youngest of those children between the ages of 6 and 23 months at endline. There were 805 such youngest children. For the youngest child sample, anthropometric data were available for all 805 children, with no dates of birth missing.

While the mothers of 2,084 index children were found at the time of endline, the sample of these children that was used for the analysis of anthropometry, dietary, and other index child-related outcomes was affected by two additional issues: age estimation and anthropometry refusals. We describe each below.

Figure 2-2 provides the sample distribution, attrition (from baseline to endline), loss, and final sample used for analysis of outcomes at woman and child level. Table 2.3 summarizes the sample sizes across respondent type for baseline and endline by treatment arm.

[2] Respondent women were not found in two households, so no additional information was collected on them.

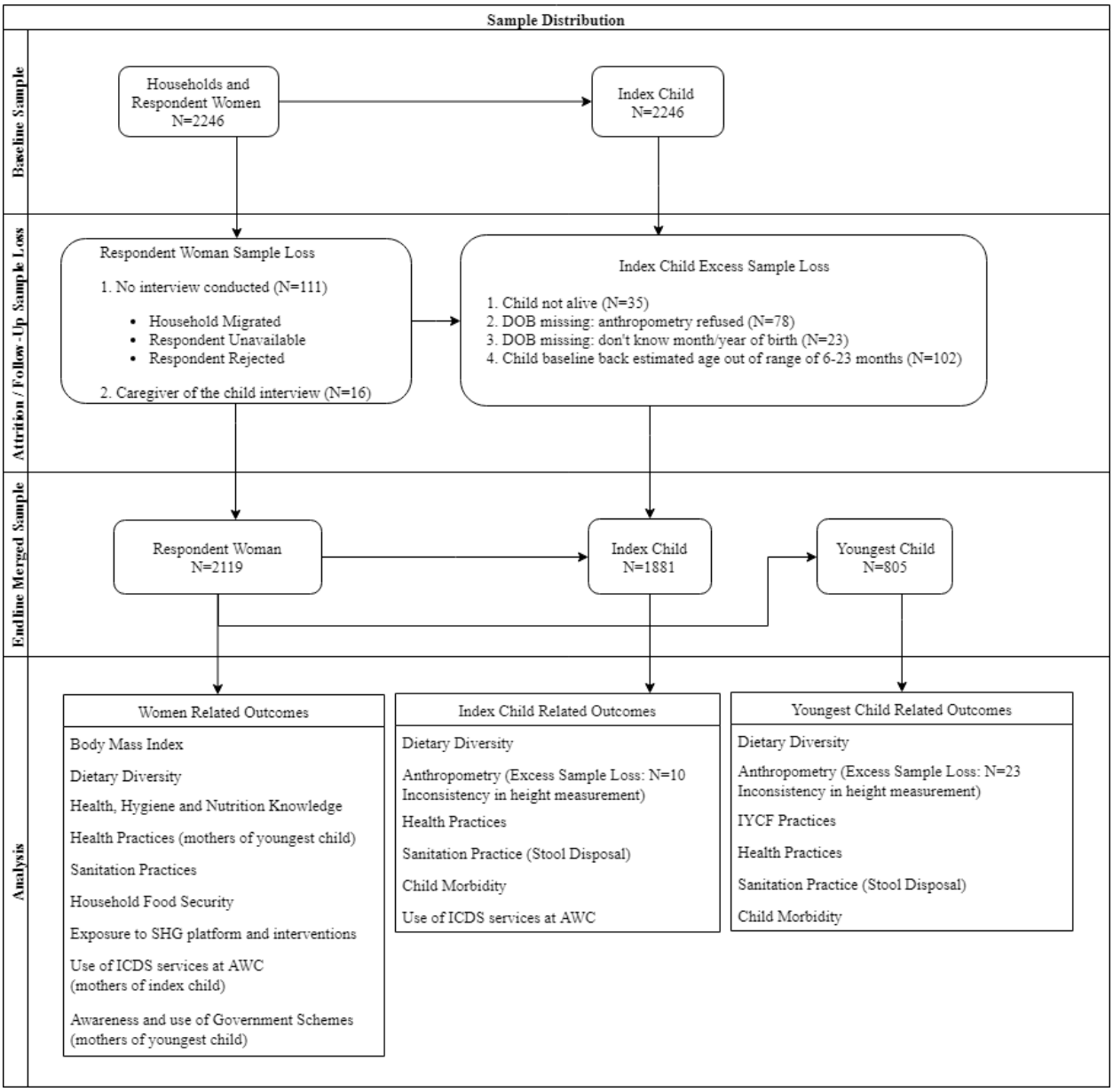

Figure 2-2 Sample distribution (attrition and loss)

Table 2.3 Baseline and endline sample size and distribution

	Baseline		Endline		Attrition rate*	
	Treatment	**Control**	**Treatment**	**Control**	**Treatment**	**Control**
Household						
Respondent women	1,164	1,082	1,096	1,023	5.8	5.4
Index child (youngest child 6–23 months at baseline)	1,164	1,082	971	910	5.8	6.3
Youngest child 6–23 months at endline			423	382		
Community Mobilizer	67	55	65	55		
Community Accredited Social Health Activist	59	60	68	60		
Anganwadi worker	65	56				
Health Sub-Committee	71	60				
			67			

*The attrition rate is only applicable to households, as they were followed over both rounds of the survey.

2.2. Data Analysis

2.2.1. Attrition analysis

As mentioned above, we were unable to interview 5.65 percent of the respondent women at the time of the endline. To allay concerns that the respondent women we lost were somehow different from those we were able to re-interview, we conducted a detailed analysis of the characteristics of both types of respondent women. Next, we estimated a probit model for whether the respondent women were found at endline, on

Attrition findings

- At endline, we re-interviewed 2,119 out of 2,246 respondent women, with an attrition rate of only 5.6 percent. This is low relative to other panel surveys.
- There were some differences in attrition by treatment arm. Households in the control group were slightly less likely to be lost (5.5 percent) than households in the treatment group (5.8 percent).
- The attrition among index children was slightly higher than that of women, at 16.25 percent over the 30-month period.
- The primary differences were in demographic and socioeconomic characteristics such as the floor of the dwelling was made of improved materials, number of females in the range 16–30 and 31–54 years, and level of schooling.
- Attrition was not correlated with the treatment dummy, suggesting it is not of major concern in the overall impact evaluation analysis.

Note: Attrition analysis methods and detailed results are available in Appendix A. Attrition

characteristics that looked like they might be important from the comparison of these characteristics in the previous step. We also undertook this analysis for the index children sample.

2.2.2. Impact estimates on primary and secondary outcomes

Table 2.4 summarizes the econometric models used in calculating intent-to-treat (ITT) impact estimates. For outcome indicators for which we had data from the baseline as well as the endline (e.g., maternal BMI, maternal reported dietary diversity and child reported dietary diversity) we estimated the ITT effects using the analysis of covariance (ANCOVA) estimator. For outcome indicators for which we had data only from the endline, we estimated the ITT effects using the single-difference estimator. Since the intervention was randomized at the Gram Panchayat level, we adjusted standard errors for clustering at that level. In addition, we corrected the p-values for the small number of clusters using the wild bootstrap method implemented in STATA 15 with the command *boottest* (Roodman et al. 2019). The detailed description of the ANCOVA models run can be found in Appendix Table B.1.

Table 2.4 Summary of models used for estimating impact

Impact estimate/Model	**Regression model**
ITT/ANCOVA	$Y_{i1} = \alpha + \beta Y_{i0} + \delta T_i + \varepsilon_i,$ where Y_{i1} is the level of the outcome for individual *I* at endline, Y_{i0} is the level of the outcome for individual *i* at baseline, T_i is the treatment dummy, and, ε_i is the error term.
ITT adjusted/ANCOVA	$Y_{i1} = \alpha + \beta Y_{i0} + \delta T_i + \sum_{j=1}^{J} \gamma_j x_{ij0} + \varepsilon_i,$ where Y_{i1} is the level of the outcome for individual *i* at endline, Y_{i0} is the level of the outcome for individual *i* at baseline, T_i is the treatment dummy, x_{ij0} is a vector of individual and household characteristics, and ε_i is the error term.
ITT/Single difference	$Y_{i1} = \alpha + \delta T_i + \varepsilon_i,$ where Y_{i1} is the level of the outcome for individual *i* at endline, T_i is the treatment dummy, and ε_i is the error term.
ITT adjusted/Single difference	$Y_{i1} = \alpha + \delta T_i + \sum_{j=1}^{J} \gamma_j x_{ij0} + \varepsilon_i,$ where Y_{i1} is the level of the outcome for individual *i* at endline, T_i is the treatment dummy, x_{ij0} is a vector of individual and household characteristics, and ε_i is the error term.

Notes: In all regression models above, standard errors will be clustered at the Gram Panchayat level. We adjusted for the small number of clusters by calculating p-values using the wild bootstrap method

2.2.3. Intervention: Delivery and exposure

Documenting exposure to the intervention is key to interpreting the impact results. We present descriptive results of information collected from the JEEViKA platform module in the household questionnaire as they relate to exposure to the intervention and its implementation.

2.3. Ethical Approval and Trial Registry

Ethical approval for the study was obtained from IFPRI's internal Institutional Review Board (IRB) as well as from a local IRB firm, Sigma. For this purpose, final translated questionnaires and the consent form were submitted for review by the committee and were deemed acceptable within the IRB guidelines.

This study was registered at 3ie's Registry for International Development Impact Evaluations with the study ID: RIDIE-STUDY-ID-57b237eb214e4 and can be accessed at: https://ridie.3ieimpact.org/index.php?r=search/detailView&id=451

3. CONTEXT

In this chapter we describe the survey sample and present summary statistics on demographic and socioeconomic characteristics of the surveyed households and the primary respondent women. We also present data on access to health facilities and front-line workers at the community level. This chapter is intended to summarize the context and allow the reader to better situate the results to follow.

3.1. Household Characteristics

We begin by acknowledging that our study sample is not representative of women within Saharsa, and that Saharsa itself is not representative of Bihar. Out of 599 Indian districts, Saharsa ranks 582 on the District Development and Diversity index, and it is the eighth lowest district within the thirty-eight districts of Bihar (Shariff 2015). Table 3.1 compares some socio-economic characteristics of the study sample at baseline vis-à-vis the whole district and the state of Bihar using unit-level data from the fourth round of National Family Health Survey (NFHS-4). This will allow the reader to compare our sample to the district and state averages.

Our study sample is predominantly Hindu and belongs to either Other Backward Classes (OBC) or the Scheduled Caste (SC) social group. The average household size was close to 7 people, and the mean years of schooling for the respondent woman was only 2.2 years. On average, women got married at the age of 17 years, and had their first baby at 19.6 years. Households were quite poor, owning only 6 out of a total of 25 possible assets, on average. About 73% of the women were not employed. 22% of the sample reported that their husbands were employed in agriculture, 42% in non-agricultural day labour, and 13% as migrant labourers. Nearly three-fourths of the women have a bank account, which is much higher than the 49% of men who have bank accounts.

Comparing our sample to Saharsa and Bihar overall, we find that households in our sample are more likely (than the average household in the district or state) to be Hindu and to be from either the scheduled caste or tribe groups. The households in our sample are larger and the women we surveyed have fewer years of education, on average. The average age of a respondent, age at marriage and age at first birth is similar across the three samples, but the women in our sample are less likely to be unemployed. Their husbands are considerably less likely to be engaged in agricultural labour, but also less likely to be either a salaried worker, or unemployed. but the number of years of education is lower in our study sample.[3]

[3] We present these statistics for the whole sample. Our baseline technical report presents these by treatment and control group and reports the p-value for the difference in means between the two groups. Please refer to Kumar et al. 2017 for more details.

Table 3.1 Socio-economic indicators compared across state, district and study sample (2016)

Statistic	Baseline study sample (N=2246)	Saharsa (NFHS 4)	N	Bihar (NFHS 4)	N
Religion (of the head of household)					
Hindu	90.3	82.9	944	85	36,772
Muslim	9.7	17	944	14.8	36,772
Christian	0.1				
Caste (of the head of household)					
General	4.5	22.6	944	18.1	36,772
Scheduled Caste	36.1	19.5	944	20.7	36,772
Scheduled Tribe	2.2	0.5	944	3	36,772
Other Backward Classes	56.7	57.4	944	58.2	36,772
Average household size	6.6 (2.6)	5.3 (2.4)	944	5.3 (2.6)	36,772
Mean years of schooling for respondent	2.2 (3.8)	3.6 (4.8)	1,139	4.6 (5)	45,812
Mean age of respondent woman	25.4 (4.1)	28.5 (9.8)	1,139	28.7 (9.7)	45,812
Age at first marriage	16.8 (2.4)	17.7 (3.6)	881	17.3 (3.6)	35,372
Age at first birth	19.6 (2.3)	20.2 (3.7)	817	19.8 (3.5)	32,507
Assets owned (out of 25)	6.0 (2.7)				
Occupation of respondent					
Agriculture and related	15.5	10.4	193	11	7,355
No occupation	73.4	83.4	193	80.7	7,355
Husband's occupation					
Agricultural	21.7	54.8	93	45	4,080
Non-agriculture day labourer	41.6				
Service/salaried worker	3.3	9.7	93	15.2	4,080
Small/cottage industry	0.9				
Business/traders	5.2				
Skilled worker	7.5				
Other self-employment	3.4				
Migrant laborer	13.2				
Jobless	0.4	10.8	93	9.6	4,080
Student	1.0				
Respondent woman has bank account	74.7				
Husband has bank account	48.7				
Access to post office:					
Within village	40.3				
2 to 5 kms	50.7				
5 kms and above	9.1				
Access to government bank					
Less than 2 kms	19.2				
2 to 5 kms	52.5				
5 kms and above	28.3				
Access to private bank					
Less than 2 kms	6.5				

Statistic	Baseline study sample (N=2246)	Saharsa (NFHS 4)	N	Bihar (NFHS 4)	N
2 to 5 kms	25.2				
5 kms and above	67.3				

Source: Authors' calculations from primary data and from the 2015-16 round of the National Family Health Survey (NFHS-4). Standard deviations are reported in parantheses.

3.2. Community Characteristics

Less than a quarter of the villages in the sample reported having access to health services (Table 3.2). About 23 percent of the villages reporting having a health sub-center in the village. Even though almost every village had an Anganwadi Center, only 5 percent had a primary health center in the village and less than 1 percent had a government hospital, dispensary, or a nutrition rehabilitation center. There was a visible presence of private clinics run by unqualified practitioners (in 28 percent of the villages), raising concerns about healthcare and treatment in those villages.

Table 3.2: Access to health facilities

Access to facilities	Treatment areas		Control areas		All	
	Proportion	N	Proportion	N	Proportion	N
Health facility present in the village or not						
Anganwadi Center	94.92	59	100	60	97.48	119
Health sub-center	20.34	59	25	60	22.69	119
Primary healthcare center (PHC)	3.39	59	6.67	60	5.04	119
Additional PHC	3.39	59	6.67	60	5.04	119
Nutrition Rehabilitation Center	1.69	59	0	60	0.84	119
District/ Government hospital	1.69	59	0	60	0.84	119
Government dispensary	0	59	1.67	60	0.84	119
Private clinic	15.25	59	13.33	60	14.29	119
Private clinic run by unqualified rural health practitioner (Neem Hakim)	25.42	59	30	60	27.73	119
Private Hospital/ Nursing home	0	59	1.67	60	0.84	119

Source: Authors' calculations.

About 80 percent of the villages had electricity supply for more than six hours a day and about 15 percent had irregular electricity supply at baseline (Table 3.3). This situation improved by endline with close to 96 percent of villages reporting more than six hours of electricity supply and less than 3 percent reporting irregular electricity. Less than 30 percent of the villages cited "piped water in the yard" as the main source of drinking water and about 65 percent reported tube well as the main source of drinking water. This indicates that households had to go to the water source and fetch water for various purposes. Even though this is less ideal than having piped water in the yard, tube well water is safer than other sources of water found in rural India (such as open wells, or rivers). Almost all villages reported the presence of open defecation in the village at baseline, indicating scope for improvement through building of toilets and improved awareness about hygiene and sanitation. There was a decline in the presence of open defecation with approximately 88 percent of the villages reporting it at endline.

Table 3.3: Access to electricity, water, and sanitation

Infrastructure	Treatment areas		Control areas		All	
	Proportion	N	Proportion	N	Proportion	N
Village has electricity supply for more than 6 hours a day	77.97	59	80.7	57	79.31	116
Village has irregular electricity supply	13.56	59	15.79	57	14.66	116
Main source of drinking water in the village is piped water in yard	27.12	59	30	60	28.57	119
Main source of drinking water in the village is tube well	62.71	59	66.67	60	64.71	119
Open defecation exists in the village	98.31	59	96.67	60	97.48	119

Source: Authors' calculations.

In addition to access to health facilities, we also gathered data on the presence of FLWs in the village. A large majority of the villages (91 percent–97 percent) had Anganwadi workers, Accredited Social Health Activists, Auxiliary Nurse Midwifes, and JEEViKA CMs (Table 3.4). Some villages reported

having doctors (13 percent) and nongovernmental organization (NGO) health workers (7 percent). Although the presence of most government FLWs remained constant over the two-year period between baseline and endline, the percentage of villages reporting the presence of NGO health workers increased to 23 percent by endline.

Table 3.4: Availability of frontline workers

Frontline workers providing services in the village	Treatment areas		Control areas		All	
	Proportion	N	Proportion	N	Proportion	N
Anganwadi worker	96.61	59	98.33	60	97.48	119
Accredited Social Health Activists	94.92	59	95	60	94.96	119
ANM	96.61	59	98.33	60	97.48	119
Doctors	10.17	59	16.67	60	13.45	119
Nongovernmental (NGO) health worker/volunteer	10.17	59	3.33	60	6.72	119
JEEViKA community mobilizer	93.22	59	88.33	60	90.76	119

Source: Authors' calculations.

4. RESULTS: PRIMARY OUTCOMES

This chapter reports the impact estimates for the two primary outcomes, women's BMI and reported dietary diversity for the child. For women's BMI we present results on mean BMI as well as the likelihood of being underweight for all women in our sample. For child dietary diversity we present results on the average number of food groups reported being consumed and on the proportion of children consuming each food group. Finally, we present these results for both the index and youngest child.

Chapter 4: Overview

Research question addressed: Do the JEEViKA-MC interventions lead to improved nutrition outcomes when compared to the basic JEEViKA intervention?

Outcomes analysed

- Woman—BMI
- Index child—dietary diversity
- Youngest child—dietary diversity

Main findings

Woman:

- The intervention had no impact on women's BMI, or on the likelihood of the woman being underweight.

Index child:

- The intervention had a positive and significant impact on dietary diversity of the index child
- The largest impacts were on consumption of pulses, vitamin A–rich fruits and vegetables, other fruits and vegetables, and dairy.

Youngest child:

- The intervention had a positive and significant impact on the number of food groups consumed by the youngest child
- There was no impact on achievement of minimum dietary diversity among the youngest children. However, the proportion of children 6–23 months old who achieved minimum dietary diversity more than doubled, in both groups, from baseline to endline.
- Finally, adjusting for social desirability bias has no impact on the direction and significance of our results.

4.1. Women's Body mass index (BMI)

At baseline, average BMI among all women in the sample was 19.07 (± 2.3) and there were no significant differences in BMI between women in the treatment and comparison arms. Figure 4-1 gives the distribution of women into underweight (BMI < 18.5 kg/m^2), normal (18.5 < BMI < 25 kg/m^2), and overweight (BMI > = 25 kg/m^2) at baseline and at endline in both arms. Overall, at baseline, slightly over half the respondent women were of normal weight and 44 percent were underweight. At endline, the proportion of women who were of normal weight increased in both arms, though this increased more in the comparison arm. The proportion who were underweight also declined in both arms, again slightly more in the comparison arm than in the treatment arm.

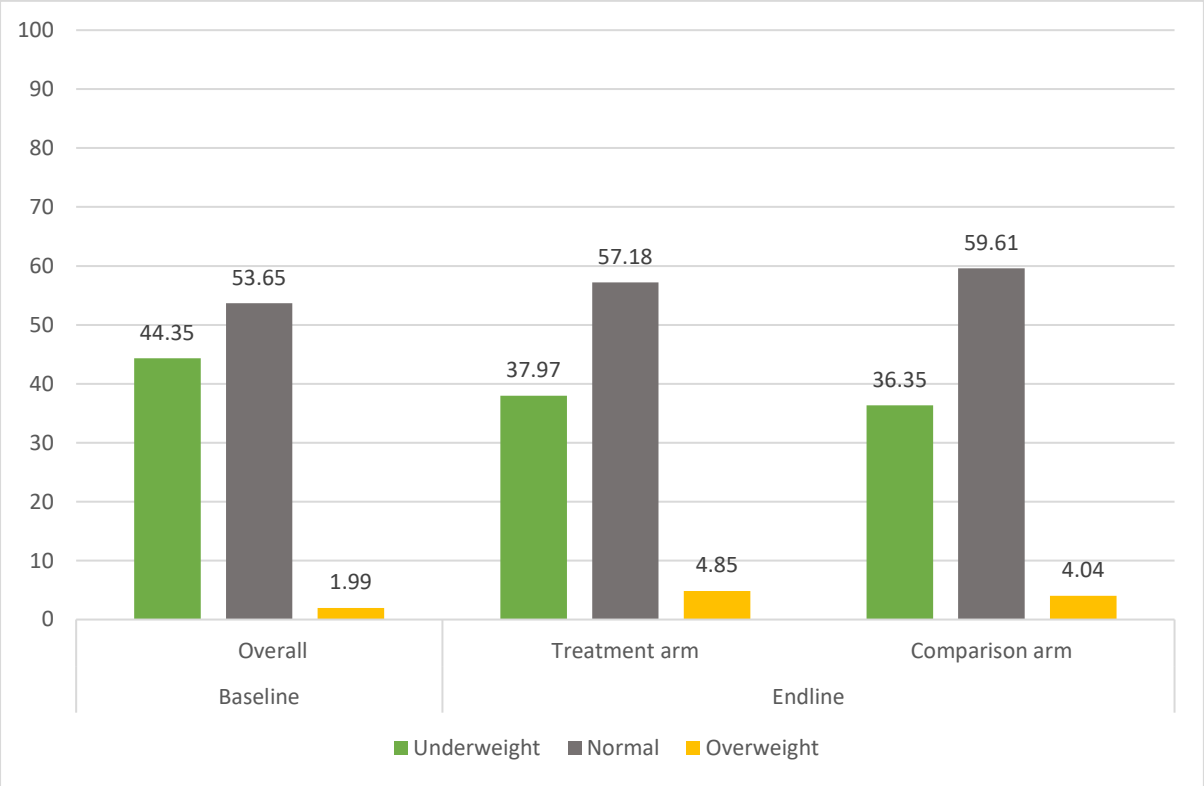

Figure 4-1 Proportion of women by BMI categories: underweight, normal, and overweight at baseline and endline

Table 4.1 presents the estimates of the impact of the JEEViKA-MC intervention on women's BMI. The mean BMI in the comparison arm at baseline is provided for reference.[4] Regardless of the specification employed we find no impact of the pilot interventions on women's BMI; impact estimates are negative but insignificant in all cases. We do not see any impact of the pilot interventions on the probability that a woman is underweight, defined as having a BMI less than 18.5 kg/m^2 (Table 4.2), regardless of the specification employed.

[4] For tables where there is no corresponding baseline outcome, the endline mean in the comparison arm is used as a benchmark instead.

Table 4.1 Impact of the JEEViKA-MC pilot on maternal body mass index

	Respondent woman		
	Body mass index		
	(1)	**(2)**	**(3)**
Treatment dummy (= 1 if treatment Gram Panchayat)	−0.008	−0.025	−0.025
	(0.088)	(0.084)	(0.082)
P-value cluster	0.928	0.771	0.762
P-value bootstrap	0.943	0.781	0.775
Comparison arm mean	19.085	19.085	19.085
Observations	2,108	2,103	2,103

Source: Authors' calculations.

Notes:

1. *p < 0.10; **p < 0.05; ***p < 0.01
2. Standard errors in parentheses
3. Regression specification accounts for survey design (clustering at Gram Panchayat level), with block-level fixed effects. Both clustered and wild bootstrapped p-values have been estimated for each specification
4. The first column in each table reports the unadjusted base specification, i.e., the coefficient on the treatment indicator without controlling for any additional characteristics. Each subsequent column adds a set of covariates: column 2 adds those baseline covariates that were unbalanced at the 10 percent level, and column 3 controls for these baseline unbalanced characteristics as well as other relevant baseline characteristics
5. Baseline covariates unbalanced at 10 percent include: HH size, no. female HH members, HH head is General caste, HH has electricity, HH floor is made of improved material, respondent woman's husband is HH head, highest number of years of schooling in the HH (female) and dummy for respondent woman being an agricultural laborer. The full list of covariates includes: all those covariates unbalanced at 10 percent; in addition, the number of assets owned by the HH, caste of HH head, HH head is Muslim, 10 dummies for HH demographic structure, any female HH member has bank account, respondent woman age, dummies for respondent woman being a non-agricultural day laborer or a housewife.
6. All columns control for baseline values of the outcome variable
7. Baseline comparison arm mean values are provided for comparison

Finally, we present the kernel densities of women's BMI for both baseline and endline, disaggregated by treatment status (Figure 4-2). In each graph the dashed line represents the comparison arm and the solid line the treatment arm. The vertical line at 18.5 kg/m^2 provides the reference cut-off for underweight. As is clear from these graphs, the kernel densities for comparison and treatment arms are close to indistinguishable. There does not appear to have been much movement in the curves between baseline and endline.

Table 4.2 Impact of the JEEViKA-MC pilot on the respondent woman's likelihood of being underweight

	Respondent woman		
	Likelihood of being underweight		
	(1)	(2)	(3)
Treatment dummy (= 1 if treatment Gram Panchayat)	0.000	0.003	0.002
	(0.017)	(0.017)	(0.017)
P-value cluster	0.988	0.840	0.911
P-value bootstrap	0.993	0.850	0.923
Comparison arm mean	0.431	0.431	0.431
Observations	2,108	2,103	2,103

Source: Authors' calculations.
Notes:
1. *p < 0.10; **p < 0.05; ***p < 0.01
2. Standard errors in parentheses
3. Regression specification accounts for survey design (clustering at Gram Panchayat level), with block-level fixed effects. Both clustered and wild bootstrapped p-values have been estimated for each specification
4. The first column in each table reports the unadjusted base specification, i.e., the coefficient on the treatment indicator without controlling for any additional characteristics. Each subsequent column adds a set of covariates: column 2 adds those baseline covariates that were unbalanced at the 10 percent level, and column 3 controls for these baseline unbalanced characteristics as well as other relevant baseline characteristics
5. Baseline covariates unbalanced at 10 percent include: HH size, no. female HH members, HH head is General caste, HH has electricity, HH floor is made of improved material, respondent woman's husband is HH head, highest number of years of schooling in the HH (female) and dummy for respondent woman being an agricultural laborer. The full list of covariates includes: all those covariates unbalanced at 10 percent; in addition, the number of assets owned by the HH, caste of HH head, HH head is Muslim, 10 dummies for HH demographic structure, any female HH member has bank account, respondent woman age, dummies for respondent woman being a non-agricultural day laborer or a housewife.
6. All columns control for baseline values of the outcome variable
7. Baseline comparison arm mean values are provided for comparison

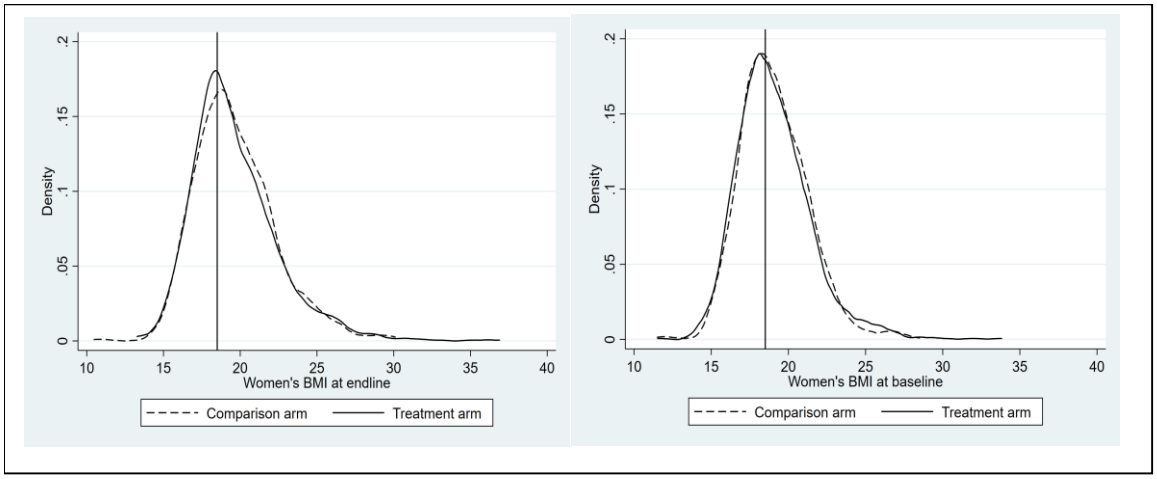

Figure 4-2 Kernel densities of respondent woman's BMI by treatment arm, baseline, and endline

4.2. Child Dietary Diversity

We present results on reported dietary diversity for both the index child and the youngest child. At endline, the index child was not within the age range for which minimum dietary diversity is calculated. Therefore, for these children we only report results on the number of food groups consumed in the

previous 24 hours. However, for the youngest children we report both the number of food groups as well as the results on an indicator for whether the child achieved minimum dietary diversity.[5] For children, this is defined as consuming at least four out of seven food groups.[6]

4.2.1. Index child

At baseline, reported dietary diversity among the index children was quite poor in both arms (Figure 4-3). A large proportion consumed grains (78 percent overall) and dairy (61 percent overall). However, the proportion of children consuming other food groups such as fruits, vegetables, and pulses (39 percent) and vitamin A-rich fruits and vegetables (24 percent) was low. Consumption of eggs and flesh foods was negligible. To investigate this further, we collected information on the child being vegetarian at the time of the endline survey. We find that 82 percent of the children were not identified as being vegetarian, so the low consumption of eggs and flesh foods is likely more a result of limited resources than of preference.[7]

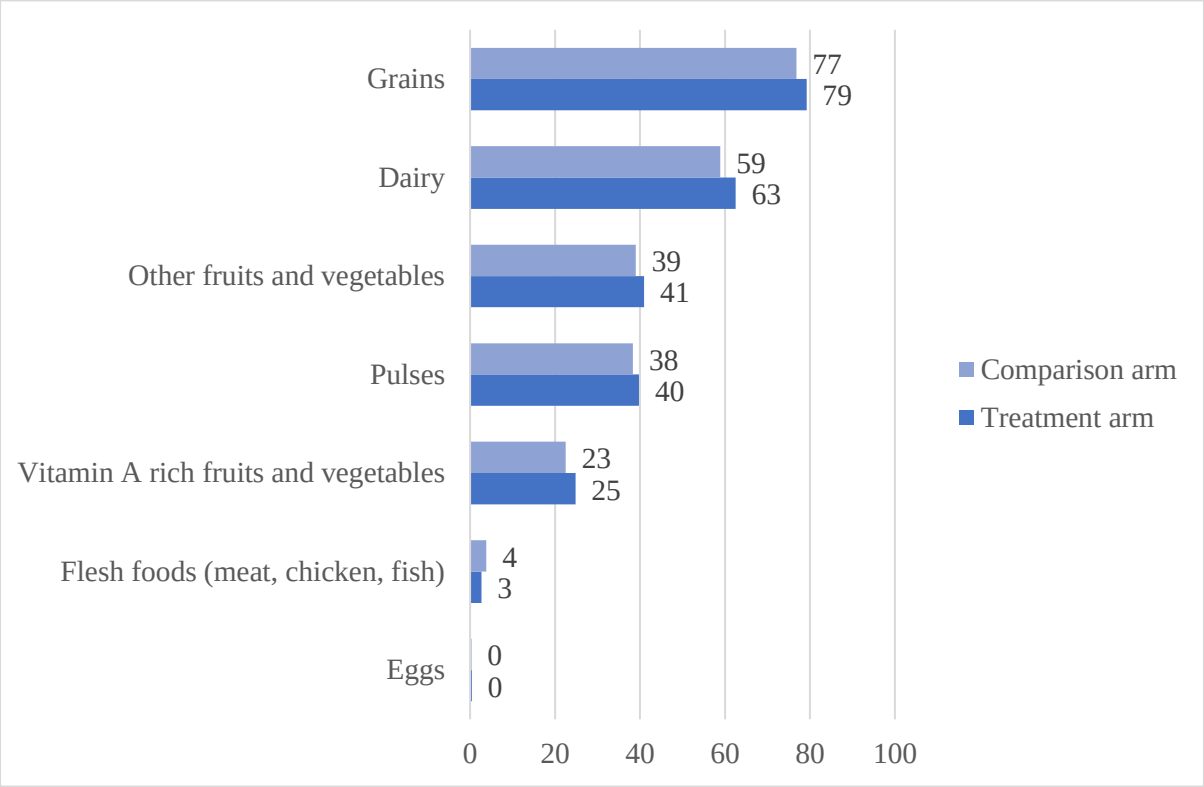

Figure 4-3 Proportion of index children consuming each food group at baseline, by treatment arm

The mean number of food groups consumed by the index children at baseline was low at 2.45 (± 1.46) food groups, and only 25.9 percent of these children satisfied minimum dietary diversity. In our baseline

[5] Unlike the index child sample, the sample of youngest children was not selected at random, so there could be concerns that the results on the youngest children are driven by selection into pregnancy or other household characteristics that differ across households that did or did not have young children. We checked for such an imbalance. While some characteristics were indeed unbalanced—demographic characteristics like head of HH is Muslim, household size, respondent woman age and education—we controlled for all these (and several other) characteristics in our regression analyses. The full comparison of HHs with and without youngest children is in Appendix Table B.1 and Table C.1.

[6] The seven food groups for children are grains; pulses; dairy; eggs; flesh foods; vitamin A-rich fruits; and vegetables and other fruits and vegetables.

[7] It is possible that these foods are not considered easy for small children to digest, and hence are not fed to them. However, these index children were between 3 and 4.5 years at endine, by which time most foods have been introduced.

report (Kumar et al. 2017) we indicated that there was a potential for improvement in these child diet indicators, which often prove easier to change over a short span of time than anthropometry.

From our impact estimates, it appears that the MC pilot did indeed succeed in improving the reported dietary diversity of these index children (Table 4.3). We find positive and significant (albeit small) impacts of treatment in all four specifications. In the fully specified model (column 3), we find a small increase in the number of food groups consumed of 0.17 (p (bootstrap) < 0.1). This is presented graphically in Figure 4-4.[8]

Table 4.3 Impact of the JEEViKA-MC pilot on reported dietary diversity among index children

	Index child		
	Total number of food groups consumed in last 24 hours		
	(1)	**(2)**	**(3)**
Treatment dummy (= 1 if treatment Gram Panchayat)	0.194	0.166	0.169
	(0.077)	(0.078)	(0.080)
P-value cluster	0.018**	0.043**	0.046**
P-value bootstrap	0.046**	0.081*	0.089*
Comparison arm mean	3.88	3.88	3.88
Observations	1,881	1,878	1,878

Source: Authors' calculations.

Notes:

1. *p < 0.10; **p < 0.05; ***p < 0.01
2. Standard errors in parentheses
3. Regression specification accounts for survey design (clustering at Gram Panchayat level), with block-level fixed effects. Both clustered and wild bootstrapped p-values have been estimated for each specification
4. The first column in each table reports the unadjusted base specification, i.e., the coefficient on the treatment indicator without controlling for any additional characteristics. Each subsequent column adds a set of covariates: column 2 adds those baseline covariates that were unbalanced at the 10 percent level, and column 3 controls for these baseline unbalanced characteristics as well as other relevant baseline characteristics
5. Baseline covariates unbalanced at 10 percent include: HH size, no. female HH members, HH head is General caste, HH has electricity, HH floor is made of improved material, respondent woman's husband is HH head, highest number of years of schooling in the HH (female) and dummy for respondent woman being an agricultural laborer. The full list of covariates includes: all those covariates unbalanced at 10 percent; in addition, the number of assets owned by the HH, caste of HH head, HH head is Muslim, 10 dummies for HH demographic structure, any female HH member has bank account, respondent woman age, dummies for respondent woman being a non-agricultural day laborer or a housewife.
6. All columns control for baseline values of the outcome variable
7. All columns additionally control for endline values of child's age and gender dummy
8. Baseline comparison arm mean values are provided for comparison

[8] The IE value shown in the graph is the difference between actual means. This is slightly different from the regression impact estimates as the regression controls for block fixed effects and other controls (which reduces the estimate value).

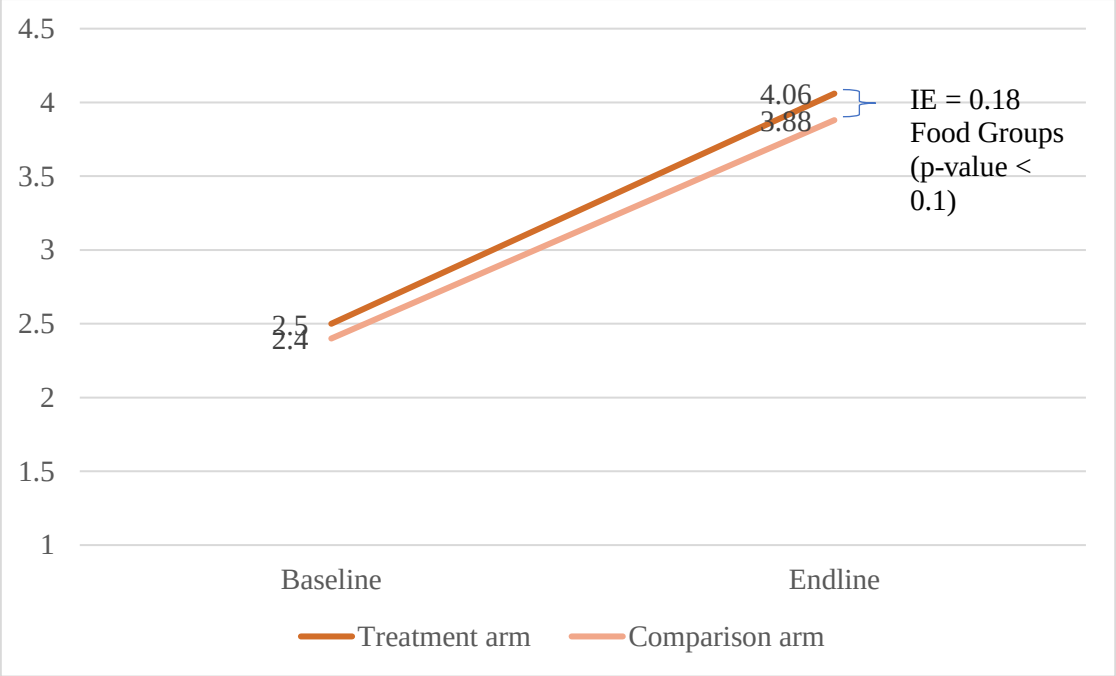

Figure 4-4 Impact of the JEEViKA-MC intervention on average number of food groups consumed among index children at baseline and endline, by treatment arm

To further investigate the source of this change in reported dietary diversity, we study the proportions of index children consuming each food group (Figure 4-5) and provide both baseline and endline numbers to enable comparison. While proportions consuming almost all food groups have increased, as would be expected with the growth of the child, the largest increases are in pulses (both arms), vitamin A-rich fruits and vegetables (only treatment arm), other fruits and vegetables (only treatment arm), and dairy (both arms). The dramatic improvement in consumption of pulses between survey rounds is commendable, though it has occurred in both arms and hence cannot be attributed to the treatment alone. The increase in the reported dietary diversity score among children in the treatment arm is being driven by the increase in the proportion of children consuming vitamin A-rich fruits and vegetables and other fruits and vegetables, and not by the consumption of animal-sourced foods, which suggests there is room for further improvement (subject to budget constraints) through the promotion of these foods.

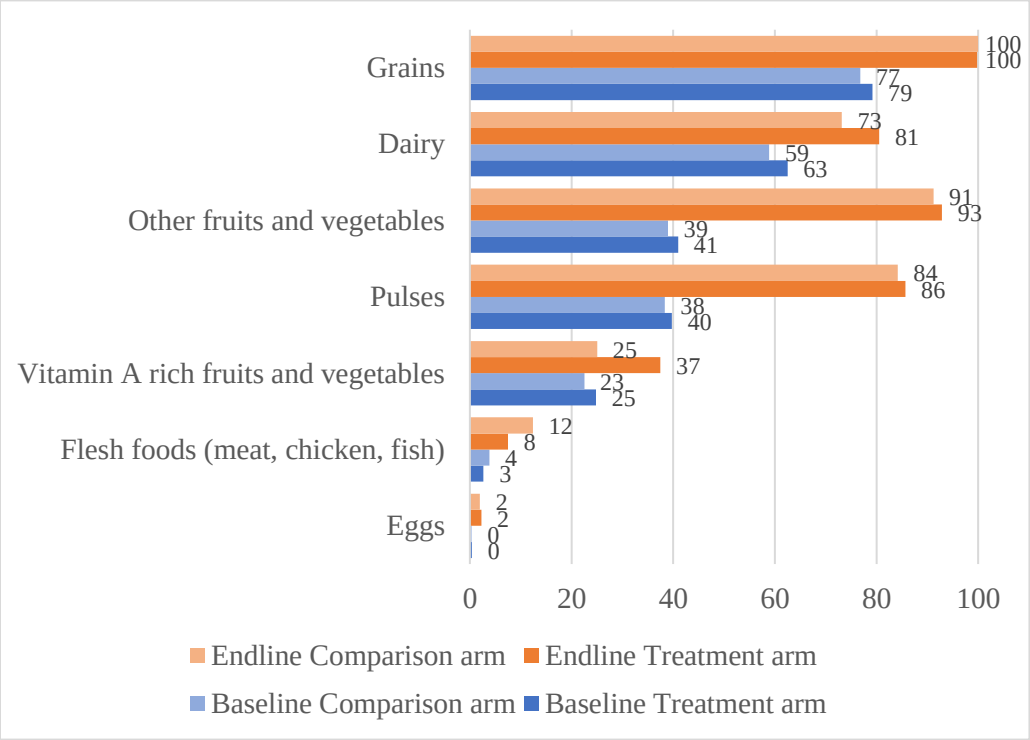

Figure 4-5 Proportion of index children consuming each food group at baseline and endline, by treatment arm

4.2.2. Youngest child

We estimated the impact of the JEEViKA-MC pilot treatment on the reported dietary diversity of the youngest child in the household age between 6 and 23 months at the time of endline. Since we do not have information on these children from the baseline, the results presented here are from single-difference models with and without adjustment, and the mean in the comparison arm at endline is provided for comparison. We controlled for baseline household characteristics as in the models above.

We found a positive and significant impact of the treatment on the number of food groups consumed by the youngest children (Table 4.44). In the full specification (column 3), we found an increase of 0.3 (p (bootstrap) < 0.1), an 8.4 percent increase over the comparison arm mean. It is worth noting that the mean number of food groups being consumed by the youngest children in the comparison arm at endline is higher than the number of food groups consumed by the index children of similar age in the comparison arm at baseline (3.41 versus 2.23). This may indicate a secular trend in the improvement of diets, or the impact of seasonality, given that the baseline and endline surveys were conducted at different times of the year.

Figure 4-6 is a graphical representation of this change in the number of food groups over time. Since we do not have baseline information on the youngest children, we used the baseline sample of index children (who were also age 6–23 months) of the same sample numbers for comparison. These are *not* double-difference estimates, but repeated cross-sections of children in the same age group.

Finally, we investigated the impact of the treatment on whether the child achieves minimum dietary diversity (Table 4.55). The outcome variable is a dummy which takes the value of 1 if the child consumes at least 4 out of 7 food groups in the last 24 hours based on the dietary recall. We found no significant

increase in the probability of achieving minimum dietary diversity. However, at endline, 58.3 percent of children consumed four or more food groups (61.9 in the treatment arm, 54.5 in the comparison arm), which is a large improvement over baseline, where only 22.6 percent of the all index children achieved minimum dietary diversity (24.1 in the treatment arm, 20.9 in the comparison arm). Again, this could be indicative of a secular improvement in child diets across both arms, or of seasonality.

The changes over time are depicted graphically in Figure 4-7. Once again, baseline information on index children is used to represent changes over time, so this should be viewed as a repeated cross-section of children in the same age group, and not as a panel.

Table 4.4 Impact of JEEViKA-MC pilot on the reported dietary diversity of the youngest child

	Youngest child		
	Total number of food groups consumed in last 24 hours (starchy food in other veges)		
	(1)	**(2)**	**(3)**
Treatment dummy (= 1 if treatment Gram Panchayat)	0.292	0.261	0.286
	(0.116)	(0.120)	(0.118)
P-value cluster	0.020**	0.041**	0.024**
P-value bootstrap	0.051*	0.077*	0.054*
Comparison arm mean	3.411	3.411	3.411
Observations	805	804	804

Source: Authors' calculations.

Notes:

1. *p < 0.10; **p < 0.05; ***p < 0.01
2. Standard errors in parentheses
3. Regression specification accounts for survey design (clustering at Gram Panchayat level), with block-level fixed effects. Both clustered and wild bootstrapped p-values have been estimated for each specification
4. The first column in each table reports the unadjusted base specification, i.e., the coefficient on the treatment indicator without controlling for any additional characteristics. Each subsequent column adds a set of covariates: column 2 adds those baseline covariates that were unbalanced at the 10 percent level, and column 3 controls for these baseline unbalanced characteristics as well as other relevant baseline characteristics
5. Baseline covariates unbalanced at 10 percent include: HH size, no. female HH members, HH head is General caste, HH has electricity, HH floor is made of improved material, respondent woman's husband is HH head, highest number of years of schooling in the HH (female) and dummy for respondent woman being an agricultural laborer. The full list of covariates includes: all those covariates unbalanced at 10 percent; in addition, the number of assets owned by the HH, caste of HH head, HH head is Muslim, 10 dummies for HH demographic structure, any female HH member has bank account, respondent woman age, dummies for respondent woman being a non-agricultural day laborer or a housewife.
6. All columns additionally control for endline values of child's age and gender dummy
7. Endline comparison arm mean values are provided for comparison

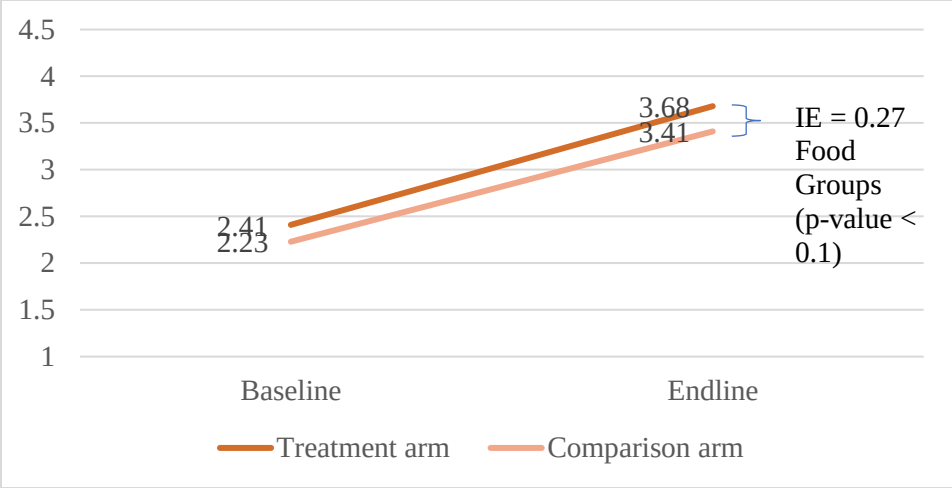

Figure 4-6 Comparison of average number of food groups consumed among children (age 6–23 months) at baseline (index child) and endline (youngest child), by treatment arm

Table 4.5 Impact of JEEViKA-MC pilot on minimum dietary diversity of the youngest child

	Youngest child		
	Child achieved minimum dietary diversity		
	(1)	**(2)**	**(3)**
Treatment dummy (= 1 if treatment Gram Panchayat)	0.077	0.063	0.076
	(0.048)	(0.048)	(0.048)
P-value cluster	0.123	0.200	0.125
P-value bootstrap	0.168	0.242	0.177
Comparison arm mean	0.545	0.545	0.545
Observations	805	804	804

Source: Authors' calculations.
Notes:
1. *p < 0.10; **p < 0.05; ***p < 0.01
2. Standard errors in parentheses
3. Regression specification accounts for survey design (clustering at Gram Panchayat level), with block-level fixed effects. Both clustered and wild bootstrapped p-values have been estimated for each specification
4. The first column in each table reports the unadjusted base specification, i.e., the coefficient on the treatment indicator without controlling for any additional characteristics. Each subsequent column adds a set of covariates: column 2 adds those baseline covariates that were unbalanced at the 10 percent level, and column 3 controls for these baseline unbalanced characteristics as well as other relevant baseline characteristics
5. Baseline covariates unbalanced at 10 percent include: HH size, no. female HH members, HH head is General caste, HH has electricity, HH floor is made of improved material, respondent woman's husband is HH head, highest number of years of schooling in the HH (female) and dummy for respondent woman being an agricultural laborer. The full list of covariates includes: all those covariates unbalanced at 10 percent; in addition, the number of assets owned by the HH, caste of HH head, HH head is Muslim, 10 dummies for HH demographic structure, any female HH member has bank account, respondent woman age, dummies for respondent woman being a non-agricultural day laborer or a housewife.
6. All columns additionally control for endline values of child's age and gender dummy
7. Endline comparison arm mean values are provided for comparison

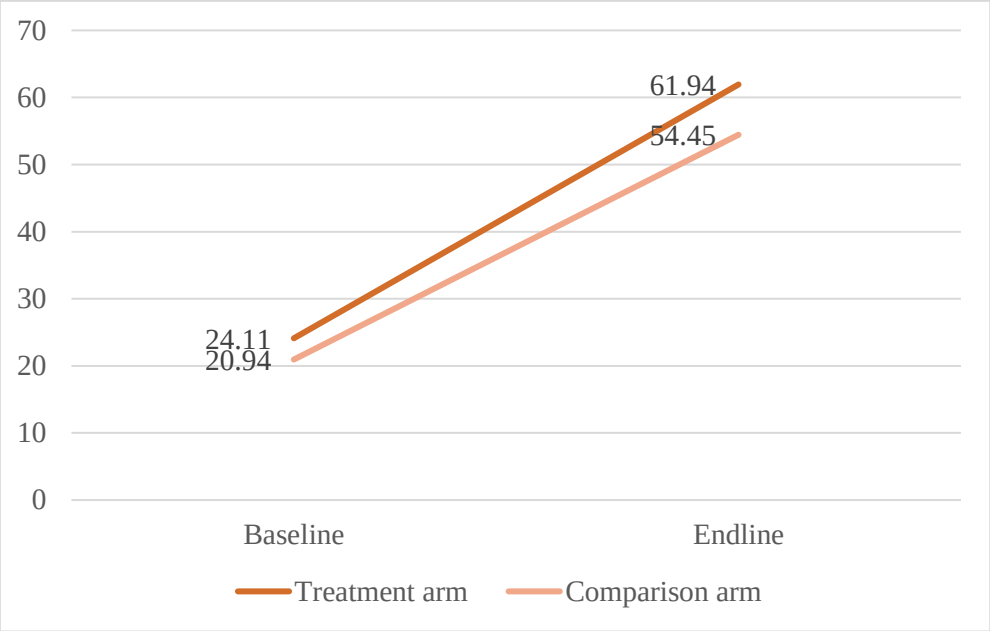

Figure 4-7 Impact of the JEEViKA-MC intervention on minimum dietary diversity achieved among children (age 6–23 months) at baseline and endline, by treatment arm

4.3. Robustness

4.3.1. Correcting for social desirability bias

Since diverse diets are a recommended behavior under the JEEViKA-MC pilot, it is possible that self-reported diets are subject to social desirability biases. We correct for this by including the individual score on a social desirability index in our regression models. This five-question index includes questions such as - "Are you always courteous, even to people who are disagreeable/not pleasant?", "When you make a mistake, are you always willing to admit it?"—and can be scored from 0 to 5. The individual score on this scale is then included in the model as an additional covariate, to see if it attenuates the results.

The adjusted impact estimates for the reported dietary diversity indicators of the index child and youngest child are provided in Appendix Table D.1–Table D.3. We find no impact of social desirability on the point estimates or their significance when the social desirability score is included in the model. This assuages concerns that results are driven by biases in self-reporting.

4.3.2. Restricting the sample to SHG members only

The second robustness check we performed was to run the same analyses using just the sub-sample of respondent women who were members of JEEViKA SHGs. These results are presented in Appendix Tables E.1-E.3. As can be seen from these tables, restricting the sample in this way does not change either the point estimates or the significance of our findings in any substantial manner.[9]

[9] Similar results are also found when investigating key secondary outcomes of women's dietary diversity and child anthropometry. Keeping in mind the length of the report, we have not presented these results, but they are available upon request.

5. RESULTS: IMPACT OF THE JEEViKA-MC PILOT ON SECONDARY OUTCOMES

This chapter presents the results of the JEEViKA-MC intervention on key secondary outcomes. Since these are at several different levels, we have organized the chapter by woman, child, and household-level outcomes.

Chapter 5: Overview

Research question addressed: Do the JEEViKA-MC interventions improve health, hygiene, and nutrition knowledge and practices of SHG members and mothers of young children compared to the basic JEEViKA intervention?

Outcomes analyzed

- Woman: dietary diversity; improved health, hygiene and nutrition knowledge; improved health, hygiene and sanitation practices
- Index child: anthropometric indicators, morbidity
- Youngest child: core and optional IYCF indicators, anthropometric indicators, morbidity
- Household: household food insecurity

Main findings

Woman:

- We find a positive and significant 10.3 pp impact of the pilot on the likelihood of women achieving minimum dietary diversity (defined as consuming 5 out of 10 food groups).
- The number of food groups consumed was higher by 0.3 food groups in the treatment arm, coming mainly from improvement in consumption of pulses, dairy, other fruits, and other vegetables. Improvement in the consumption of flesh foods or eggs was minimal, and the consumption of dark green leafy vegetables declined in both arms.
- The intervention had significant and positive impacts on several aspects of women's health and nutrition knowledge: around services provided by FLWs (3.56 pp), child feeding (3.90 pp), dietary diversity (4.15 pp), kitchen gardens (2.18 pp), and on the overall knowledge score (2.62 pp).
- Index children and youngest children in the treatment arm were more likely to be given ORS during diarrhea. No other impacts on health practices relating to the index child were observed.
- During pregnancy with the youngest children, mothers in the treatment arm were more likely to consume more iron folic acid (IFA) tablets and more calcium tablets.
- Impacts on sanitation and hygiene practices were negligible.

Index child:

- The interventions had no impact on mean anthropometric Z-scores for the index child. However, there was a small but significant *increase* in stunting and in diarrhea prevalence among index children in the treatment arm (4.5 pp for both outcomes)

Youngest child:

- The intervention had large and significant impact on the introduction of solid, semi-solid, or soft food (36 pp), and on continued breastfeeding at 2 years (13 pp).
- The intervention had no impact on anthropometric outcomes of the youngest child.
- Childhood illness was worse among children in the treatment arm for both cough and fever.

Household:

- There was no impact on household food insecurity, as measured by the HFIAS

5.1. Woman-level Secondary Outcomes

5.1.1. Dietary diversity

To assess impacts on reported dietary diversity, we collected 24-hour recall data on the consumption of ten food groups by the respondent woman at both baseline and endline. The ten food groups are grains; white roots, tubers and plantains; pulses; nuts and seeds; dairy; meat, poultry and fish; eggs; dark green leafy vegetables; vitamin A–rich fruits and vegetables; and other fruits and other vegetables. Our main indicator for women's reported dietary diversity is the percentage of women who achieved minimum dietary diversity, defined as consuming 5 out of these 10 food groups. We present this indicator descriptively, and then show the impact estimates. We then also discuss which individual food groups showed an improvement over time.

At baseline, the proportion of women attaining minimum dietary diversity (MDD) was 27.4 percent in the treatment arm, and 34 percent in the comparison arm (Figure 5-1). By the time of the endline survey, the proportion of women attaining MDD in the comparison arm did not move much, increasing only to 35.4 percent. However, the proportion in the treatment arm showed an impressive increase by almost two-thirds to 47 percent.

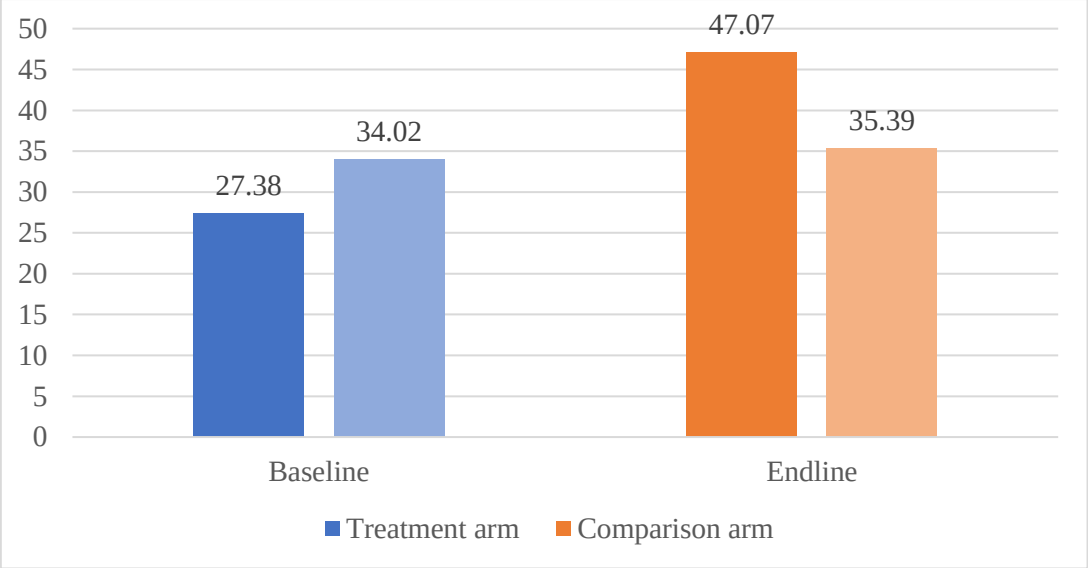

Figure 5-1 Proportion of women attaining minimum dietary diversity at baseline and endline, by treatment arm

Our endline impact estimates corroborate this descriptive finding, indicating a positive and significant impact of the pilot on the likelihood of women achieving MDD (

Table 5.1*). Here the dependent variable is an indicator that takes the value of 1 if the woman met MDD. In the full specification (column 3), we find a 10.3 pp increase in the likelihood of the woman consuming 5 out of 10 food groups (p (bootstrap) < 0.05), which represents a 30 percent increase over the baseline comparison levels. This is a substantial improvement over the course of just two and a half years of the pilot being in place. Overall, it appears that while the pilot was not successful in moving women's BMI, it has been very successful in improving the quality of women's diets.*

Table 5.1 Impact of the JEEViKA-MC pilot on proportion of women achieving minimum dietary diversity

	Respondent women		
	Women who met minimum dietary diversity (five or more food groups)		
	(1)	(2)	(3)
Treatment dummy (= 1 if treatment Gram Panchayat)	0.114	0.102	0.103
	(0.035)	(0.035)	(0.037)
P-value cluster	0.004***	0.008***	0.010**
P-value bootstrap	0.012**	0.020**	0.026**
Comparison arm mean	0.340	0.340	0.340
Observations	2,115	2,110	2,110

Source: Authors' calculations.

Notes:

1. *p < 0.10; **p < 0.05; ***p < 0.01
2. Standard errors in parentheses
3. Regression specification accounts for survey design (clustering at Gram Panchayat level), with block-level fixed effects. Both clustered and wild bootstrapped p-values have been estimated for each specification
4. The first column in each table reports the unadjusted base specification, i.e., the coefficient on the treatment indicator without controlling for any additional characteristics. Each subsequent column adds a set of covariates: column 2 adds those baseline covariates that were unbalanced at the 10 percent level, and column 3 controls for these baseline unbalanced characteristics as well as other relevant baseline characteristics
5. Baseline covariates unbalanced at 10 percent include: HH size, no. female HH members, HH head is General caste, HH has electricity, HH floor is made of improved material, respondent woman's husband is HH head, highest number of years of schooling in the HH (female) and dummy for respondent woman being an agricultural laborer. The full list of covariates includes: all those covariates unbalanced at 10 percent; in addition, the number of assets owned by the HH, caste of HH head, HH head is Muslim, 10 dummies for HH demographic structure, any female HH member has bank account, respondent woman age, dummies for respondent woman being a non-agricultural day laborer or a housewife.
6. All columns control for baseline values of the outcome variable
7. Baseline comparison arm mean values are provided for comparison

At baseline, average reported dietary diversity among respondent women in the sample was 3.79 (± 1.42). At endline, the average women's reported dietary diversity score was 4.46 (± 1.36) for the treatment group, and 4.13 (± 1.29) for the comparison group, suggesting improvements in both groups over time, with greater, albeit small, improvements in the treatment group.

To investigate the dietary diversity findings further, we looked at the proportion of women consuming each of the individual food groups. At baseline, the consumption of various food groups was balanced across arms (Figure5.2). All women reported consuming starchy staples (grains, roots, and tubers), showing a dependency on cereal calories as a primary source of energy. Only around one in three women in both arms reported consuming dark green leafy vegetables, and only 35 percent women reported consuming vitamin A-rich fruit and vegetables. As we indicated in our baseline report, there was scope to improve dietary diversity among women through the introduction of dark green leafy vegetables, vitamin A-rich fruit and vegetables, other vegetables, and nuts and seeds (Raghunathan et al. 2017b).

The food groups in which we see an improvement over time are pulses, dairy, other fruits, and other vegetables (Figure 5-2). There are increases in the proportion consuming nuts and seeds as well, but the overall numbers are very low. We do not see much improvement in the consumption of flesh foods or eggs, and the consumption of dark green leafy vegetables has declined in both arms. This suggests that

further improvements in diets are possible through reinforced messaging around these three food groups. On the other hand, though 77 percent of the women reported that they are non-vegetarian, a much smaller proportion reported actually eating flesh foods in the 24 hours prior to the survey. This suggests that providing information about the consumption of these foods may not have a large effect, as it is likely that it is the resource constraint that is more salient for these households.

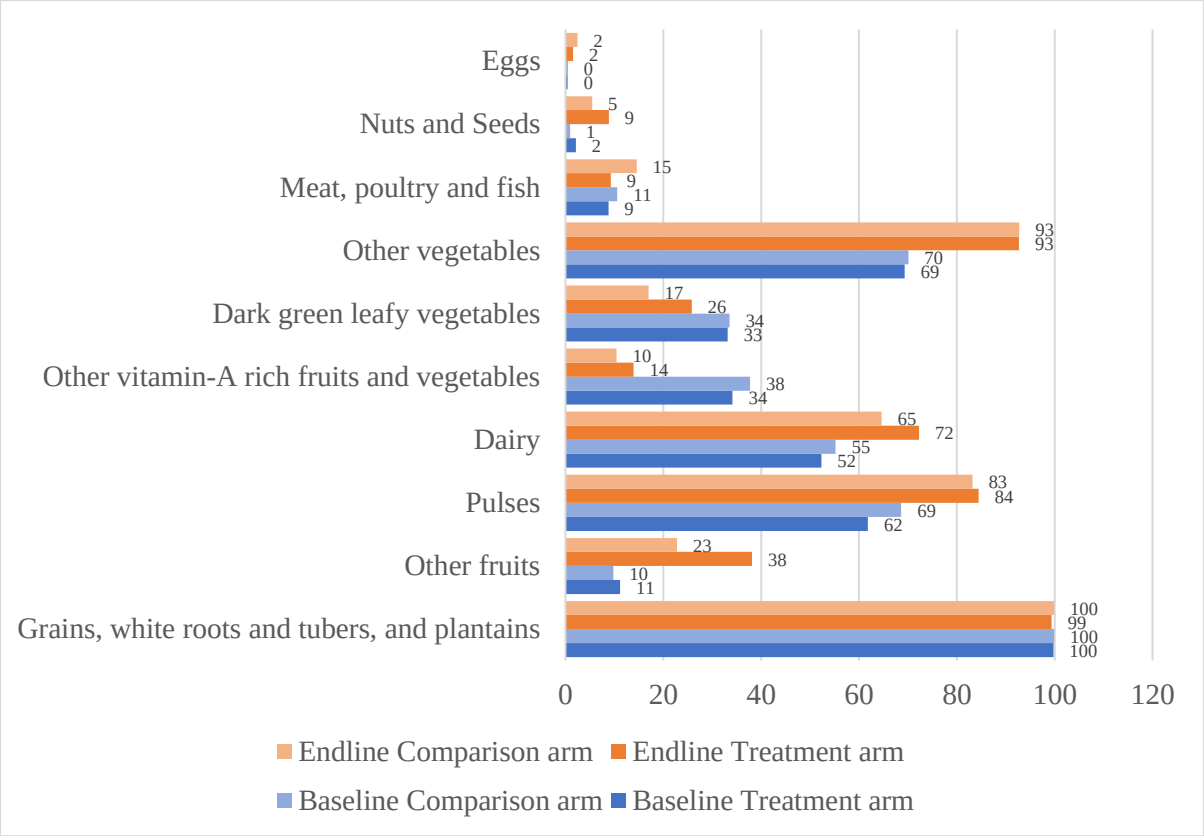

Figure 5-2 Proportion of respondent women consuming each food group at baseline and endline, by treatment arm

We use the regression framework to investigate the significance of this impact of the pilot on the number of food groups consumed (

Table 5.2). The dependent variable in this set of results is the number of food groups consumed by the respondent woman in the last 24 hours. In the full specification with all controls (column 3), we estimate an increase in the number of food groups consumed of 0.3 (p (bootstrap) < 0.10), which constitutes a 7.8 percent increase over the baseline comparison group mean. This is a sizeable improvement.

Table 5.2 Impact of the JEEViKA-MC pilot on women's reported dietary diversity

	Respondent women		
	Total number of food groups consumed in last 24 hours		
	(1)	(2)	(3)
Treatment dummy (= 1 if treatment Gram Panchayat)	0.338	0.307	0.309
	(0.120)	(0.120)	(0.126)
P-value cluster	0.010**	0.017**	0.022**
P-value bootstrap	0.031**	0.042**	0.051*
Comparison arm mean	3.869	3.869	3.869
Observations	2,115	2,110	2,110

Source: Authors' calculations.

Notes:

1. *p < 0.10; **p < 0.05; ***p < 0.01
2. Standard errors in parentheses
3. Regression specification accounts for survey design (clustering at Gram Panchayat level), with block-level fixed effects. Both clustered and wild bootstrapped p-values have been estimated for each specification
4. The first column in each table reports the unadjusted base specification, i.e., the coefficient on the treatment indicator without controlling for any additional characteristics. Each subsequent column adds a set of covariates: column 2 adds those baseline covariates that were unbalanced at the 10 percent level, and column 3 controls for these baseline unbalanced characteristics as well as other relevant baseline characteristics
5. Baseline covariates unbalanced at 10 percent include: HH size, no. female HH members, HH head is General caste, HH has electricity, HH floor is made of improved material, respondent woman's husband is HH head, highest number of years of schooling in the HH (female) and dummy for respondent woman being an agricultural laborer. The full list of covariates includes: all those covariates unbalanced at 10 percent; in addition, the number of assets owned by the HH, caste of HH head, HH head is Muslim, 10 dummies for HH demographic structure, any female HH member has bank account, respondent woman age, dummies for respondent woman being a non-agricultural day laborer or a housewife.
6. All columns control for baseline values of the outcome variable
7. Baseline comparison arm mean values are provided for comparison

The impact estimates for maternal dietary diversity presented above are in line with the results on child dietary diversity that we discussed in Chapter 4. We find that the number of foodgroups consumed and the composition of those foodgroups has changed in much the same way for both, with an increase in the consumption of pulses, other fruits and vegetables, and dairy products. Consumption of vitamin-A rich fruits and vegetables improved for children but actually declined for mothers, which could be a result of intrahousehold reallocation. Finally, the consumption of flesh foods and eggs has not changed for either group.

5.1.2. Improved health, hygiene, and nutrition knowledge

One of the key secondary outcomes the pilot attempted to improve was women's knowledge around the content of the BCC. To assess the impact of the pilot on knowledge we administered a knowledge module to the respondent woman (Appendix F). This knowledge module drew upon the BCC material developed by JEEViKA Technical Support Program and the World Bank. Each question was scored as 1 if the respondent gave the correct answer.[10] Scores on each subsection and on the knowledge test as a whole were standardized out of 100 to aid interpretation of the estimates.

We begin by presenting some descriptive statistics on the knowledge scores by subsection and overall (Table 5.3). The treatment arm scores higher in knowledge on all sub-domains, as well as overall. The largest differences are seen in child feeding, dietary diversity, and services provided by FLWs. However, the differences between arms are not large, and even the comparison arm scores a 73 (out of 100) on the overall knowledge test.

Table 5.3 Knowledge scores at endline, by treatment arm

	Treatment arm (N= 1,096)	**Comparison arm (N= 1,023)**	**p-value of difference**
Knowledge scores (out of 100)	**Mean/ Proportion**	**Mean/ Proportion**	
Sanitation	77.01	75.53	0.29
Services provided by FLWs	78.47	75.62	0.01**
Maternal health	66.92	65.53	0.34
Child feeding	63.25	59.13	0.00***
Child health	73.20	72.46	0.67
Child vaccination	77.98	75.76	0.31
Dietary diversity	89.40	84.86	0.01***
Kitchen gardens	95.55	93.62	0.09*
Overall knowledge score	74.07	71.23	0.00***

Source: Authors' calculations.
Legend: *p < 0.10; **p < 0.05; ***p < 0.01

To further investigate the impact of the treatment on these knowledge scores, we present the impact estimates for scores on each of the sub-modules in Tables 5.4–5.7, and for the overall knowledge score in Table 5.3. We group the knowledge into three categories—miscellaneous topics (sanitation, maternal health, and services provided by FLWs), child-related, and diet-related. We find statistically significant impacts on several aspects: knowledge around services provided

[10] Some questions had more than one correct response. In this case, we scored the response as 1 if *any* correct response was provided. These results can, therefore, be viewed as an 'upper bound' on the improvements in knowledge due to the pilot.

by FLWs, child feeding, dietary diversity, kitchen gardens, and on the overall knowledge score. The impact estimates point to small but significant impacts: a 3.56 pp increase in knowledge on services provided by the FLWs, which is a 4.7 percent increase over the endline mean in the comparison arm (Table 5.4); a 3.90 pp increase in knowledge score on child feeding when controlling for all covariates, which amounts to a 6.6 percent increase in knowledge relative to the mean in the comparison arm (Table 5.5); a 4.15 pp increase in knowledge on dietary diversity, which is a 4.9 percent increase (Table 5.6); and a 2.18 pp increase in knowledge on kitchen gardens, which is a 2.32 percent increase (Table 5.6). Overall knowledge improves by 2.62 pp, which amounts to a 3.7 percent increase in the knowledge score relative to the endline mean in the comparison arm (

Table 5.7).

It is interesting to note that the improvements in knowledge line up with the improvements in outcomes we saw in Chapter 4 and section 5.1 of this chapter—women in the treatment arm appear to have significantly improved their knowledge around child feeding, dietary diversity, and kitchen gardens, a key intermediate step in improving diet quality for mother and child. The section on child feeding included questions on the appropriate age to feed a child a range of different foods, while the section on dietary diversity and home cultivation asked about the benefits of various types of foods (for example, green leafy vegetables, vitamin-A rich fruits and vegetables), the components of a tri-coloured meal, and the vegetables and fruits that can be grown in the kitchen garden at different times of the year. Given the findings of Chapter 5 on child dietary diversity, it is interesting that across both arms the mean reported age at which children should be fed flesh foods or eggs was 13 months and 12 months respectively (figures not shown here). The number of months reported were almost the same in both the treatment and comparison arms, suggesting that at least for the sample of youngest children, the low consumption of these foods could be because of these beliefs about late introduction. At the same time, close to 60% of all mothers knew the benefits of protein-rich foods, with a greater proportion of treatment arm mothers giving the correct answer to this question, suggesting that the increase in pulse consumption might have been driven by improvements in knowledge.

Table 5.4 Impact of the JEEViKA-MC pilot on miscellaneous knowledge scores

	Normalized knowledge score								
	Sanitation			Maternal health			Services provided by FLWs		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Treatment dummy (= 1 if treatment Gram Panchayat)	1.248	0.852	1.092	1.060	0.776	0.762	3.461	3.424	3.556
	(1.390)	(1.309)	(1.336)	(1.314)	(1.362)	(1.337)	(0.990)	(0.949)	(0.972)
P-value cluster	0.379	0.521	0.422	0.428	0.574	0.574	0.002***	0.001***	0.001***
P-value bootstrap	0.418	0.562	0.471	0.479	0.631	0.624	0.003***	0.004***	0.002***
Comparison arm mean	75.534	75.534	75.534	65.526	65.526	65.526	75.621	75.621	75.621
Observations	2,119	2,114	2,114	2,119	2,114	2,114	2,119	2,114	2,114

Source: Authors' calculations.

Notes:

1. *p < 0.10; **p < 0.05; ***p < 0.01
2. Standard errors in parentheses
3. Regression specification accounts for survey design (clustering at Gram Panchayat level), with block-level fixed effects. Both clustered and wild bootstrapped p-values have been estimated for each specification
4. The first column in each table reports the unadjusted base specification, i.e., the coefficient on the treatment indicator without controlling for any additional characteristics. Each subsequent column adds a set of covariates: column 2 adds those baseline covariates that were unbalanced at the 10 percent level, and column 3 controls for these baseline unbalanced characteristics as well as other relevant baseline characteristics
5. Baseline covariates unbalanced at 10 percent include: HH size, no. female HH members, HH head is General caste, HH has electricity, HH floor is made of improved material, respondent woman's husband is HH head, highest number of years of schooling in the HH (female) and dummy for respondent woman being an agricultural laborer. The full list of covariates includes: all those covariates unbalanced at 10 percent; in addition, the number of assets owned by the HH, caste of HH head, HH head is Muslim, 10 dummies for HH demographic structure, any female HH member has bank account, respondent woman age, dummies for respondent woman being a non-agricultural day laborer or a housewife.
6. Endline comparison arm mean values are provided for comparison

Table 5.5 impact of the JEEViKA-MC pilot on child-related knowledge scores

	Normalized knowledge score								
	Child feeding			Child health			Child vaccination		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Treatment dummy (= 1 if treatment Gram Panchayat)	4.137	4.010	3.841	1.064	0.873	0.985	1.853	1.529	1.554
	(1.143)	(1.162)	(1.151)	(1.752)	(1.662)	(1.672)	(1.549)	(1.389)	(1.450)
P-value cluster	0.001***	0.002***	0.003***	0.550	0.605	0.562	0.244	0.283	0.295
P-value bootstrap	0.011**	0.017**	0.020**	0.557	0.617	0.588	0.269	0.301	0.315
Comparison arm mean	59.129	59.129	59.129	72.458	72.458	72.458	75.758	75.758	75.758
Observations	2,119	2,114	2,114	2,119	2,114	2,114	2,119	2,114	2,114

Source: Authors' calculations.

Notes:

1. *p < 0.10; **p < 0.05; ***p < 0.01
2. Standard errors in parentheses
3. Regression specification accounts for survey design (clustering at Gram Panchayat level), with block-level fixed effects. Both clustered and wild bootstrapped p-values have been estimated for each specification
4. The first column in each table reports the unadjusted base specification, i.e., the coefficient on the treatment indicator without controlling for any additional characteristics. Each subsequent column adds a set of covariates: column 2 adds those baseline covariates that were unbalanced at the 10 percent level, and column 3 controls for these baseline unbalanced characteristics as well as other relevant baseline characteristics
5. Baseline covariates unbalanced at 10 percent include: HH size, no. female HH members, HH head is General caste, HH has electricity, HH floor is made of improved material, respondent woman's husband is HH head, highest number of years of schooling in the HH (female) and dummy for respondent woman being an agricultural laborer. The full list of covariates includes: all those covariates unbalanced at 10 percent; in addition, the number of assets owned by the HH, caste of HH head, HH head is Muslim, 10 dummies for HH demographic structure, any female HH member has bank account, respondent woman age, dummies for respondent woman being a non-agricultural day laborer or a housewife.
6. Endline comparison arm mean values are provided for comparison

Table 5.6 Impact of the JEEViKA-MC pilot on diet-related knowledge scores

	Normalized knowledge score					
	Dietary diversity			Kitchen gardens		
	(1)	(2)	(3)	(1)	(2)	(3)
Treatment dummy (= 1 if treatment Gram Panchayat)	4.394	4.087	4.150	2.031	2.046	2.179
	(1.360)	(1.271)	(1.247)	(1.185)	(1.113)	(1.119)
P-value cluster	0.004***	0.004***	0.003***	0.100	0.079*	0.064*
P-value bootstrap	0.009***	0.007***	0.005***	0.125	0.097*	0.076*
Comparison arm mean	84.861	84.861	84.861	93.622	93.622	93.622
Observations	2,119	2,114	2,114	2,119	2,114	2,114

Source: Authors' calculations.

Notes:

1. *p < 0.10; **p < 0.05; ***p < 0.01
2. Standard errors in parentheses
3. Regression specification accounts for survey design (clustering at Gram Panchayat level), with block-level fixed effects. Both clustered and wild bootstrapped p-values have been estimated for each specification
4. The first column in each table reports the unadjusted base specification, i.e., the coefficient on the treatment indicator without controlling for any additional characteristics. Each subsequent column adds a set of covariates: column 2 adds those baseline covariates that were unbalanced at the 10 percent level, and column 3 controls for these baseline unbalanced characteristics as well as other relevant baseline characteristics
5. Baseline covariates unbalanced at 10 percent include: HH size, no. female HH members, HH head is General caste, HH has electricity, HH floor is made of improved material, respondent woman's husband is HH head, highest number of years of schooling in the HH (female) and dummy for respondent woman being an agricultural laborer. The full list of covariates includes: all those covariates unbalanced at 10 percent; in addition, the number of assets owned by the HH, caste of HH head, HH head is Muslim, 10 dummies for HH demographic structure, any female HH member has bank account, respondent woman age, dummies for respondent woman being a non-agricultural day laborer or a housewife.
6. Endline comparison arm mean values are provided for comparison

Table 5.7 Impact of the JEEViKA-MC pilot on overall knowledge scores

	Normalized knowledge score		
	Overall knowledge		
	(1)	(2)	(3)
Treatment dummy (= 1 if treatment Gram Panchayat)	2.812	2.607	2.620
	(0.870)	(0.846)	(0.839)
P-value cluster	0.004***	0.005***	0.005***
P-value bootstrap	0.013**	0.016**	0.015**
Comparison arm mean	71.231	71.231	71.231
Observations	2,119	2,114	2,114

Source: Authors' calculations.

Notes:

1. *p < 0.10; **p < 0.05; ***p < 0.01
2. Standard errors in parentheses
3. Regression specification accounts for survey design (clustering at Gram Panchayat level), with block-level fixed effects. Both clustered and wild bootstrapped p-values have been estimated for each specification
4. The first column in each table reports the unadjusted base specification, i.e., the coefficient on the treatment indicator without controlling for any additional characteristics. Each subsequent column adds a set of covariates: column 2 adds those baseline covariates that were unbalanced at the 10 percent level, and column 3 controls for these baseline unbalanced characteristics as well as other relevant baseline characteristics
5. Baseline covariates unbalanced at 10 percent include: HH size, no. female HH members, HH head is General caste, HH has electricity, HH floor is made of improved material, respondent woman's husband is HH head, highest number of years of schooling in the HH (female) and dummy for respondent woman being an agricultural laborer. The full list of covariates includes: all those covariates unbalanced at 10 percent; in addition, the number of assets owned by the HH, caste of HH head, HH head is Muslim, 10 dummies for HH demographic structure, any female HH member has bank account, respondent woman age, dummies for respondent woman being a non-agricultural day laborer or a housewife.
6. Endline comparison arm mean values are provided for comparison

5.1.3. Improved health practices

Another key secondary outcome and important immediate determinant of improved health outcomes is improvement in practices. In this subsection we examine the impact of the pilot on health and hygiene practices.[11]

For the index child, we collected information on three indicators. Two relate to treatment during diarrhea—whether the mother provided ORS or zinc, and the third relates to mother and child participation in the Village Health Sanitation and Nutrition Day in the three months prior to the survey. We do not see any impacts of the treatment on two out of these three indicators (Table 5.8) in the full specification with all controls. However, we see a 7.2 pp increase in the likelihood that the mother gave ORS when the child had diarrhea (p (bootstrap) < 0.1), which is a 14.3 percent increase in the health practice relative to the endline mean in the comparison arm.

[11] Nutrition-related practices, e.g., child feeding for children under the age of 2 years, are presented under child-level outcomes later in this chapter.

Table 5.8 Impact of the JEEViKA-MC pilot on index child health practices

	Index child: Improved health practices								
	Ever gave ORS for diarrhea			Ever gave zinc for diarrhea			Participated in Village Health Sanitation and Nutrition Day in last 3 months		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Treatment dummy (= 1 if treatment Gram Panchayat)	0.078	0.070	0.072	0.025	0.023	0.021	-0.006	-0.009	-0.009
	(0.033)	(0.032)	(0.032)	(0.023)	(0.023)	(0.023)	(0.026)	(0.026)	(0.026)
P-value cluster	0.026**	0.040**	0.037**	0.299	0.341	0.384	0.810	0.733	0.727
P-value bootstrap	0.053*	0.069*	0.053*	0.357	0.403	0.434	0.825	0.748	0.758
Comparison arm mean	0.505	0.505	0.505	0.132	0.132	0.132	0.109	0.109	0.109
Observations	1,792	1,789	1,789	1,752	1,749	1,749	1,871	1,868	1,868

Source: Authors' calculations.

Notes:

1. *p < 0.10; **p < 0.05; ***p < 0.01
2. Standard errors in parentheses
3. Regression specification accounts for survey design (clustering at Gram Panchayat level), with block-level fixed effects. Both clustered and wild bootstrapped p-values have been estimated for each specification
4. The first column in each table reports the unadjusted base specification, i.e., the coefficient on the treatment indicator without controlling for any additional characteristics. Each subsequent column adds a set of covariates: column 2 adds those baseline covariates that were unbalanced at the 10 percent level, and column 3 controls for these baseline unbalanced characteristics as well as other relevant baseline characteristics
5. Baseline covariates unbalanced at 10 percent include: HH size, no. female HH members, HH head is General caste, HH has electricity, HH floor is made of improved material, respondent woman's husband is HH head, highest number of years of schooling in the HH (female) and dummy for respondent woman being an agricultural laborer. The full list of covariates includes: all those covariates unbalanced at 10 percent; in addition, the number of assets owned by the HH, caste of HH head, HH head is Muslim, 10 dummies for HH demographic structure, any female HH member has bank account, respondent woman age, dummies for respondent woman being a non-agricultural day laborer or a housewife.
6. All columns additionally control for endline values of child's age and gender dummy
7. Endline comparison arm mean values are provided for comparison

Table 5.9 Endline impact of the JEEViKA-MC pilot on registration of pregnancy and ANC

	Mothers of youngest child: Improved health practices								
	Pregnancy was registered with any health worker			Total number of times received antenatal care during pregnancy			Gave birth in a government/private health facility		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Treatment dummy (= 1 if treatment Gram Panchayat)	0.002	0.000	0.002	0.072	0.015	0.024	-0.022	-0.028	-0.029
	(0.007)	(0.007)	(0.008)	(0.175)	(0.161)	(0.165)	(0.026)	(0.026)	(0.025)
P-value cluster	0.773	0.948	0.783	0.682	0.925	0.887	0.405	0.286	0.266
P-value bootstrap	0.813	0.954	0.830	0.699	0.924	0.878	0.427	0.313	0.277
Comparison arm mean	0.987	0.987	0.987	2.785	2.785	2.785	0.827	0.827	0.827
Observations	805	804	804	796	795	795	805	804	804

Source: Authors' calculations.

Notes:

1. *p < 0.10; **p < 0.05; ***p < 0.01
2. Standard errors in parentheses
3. Regression specification accounts for survey design (clustering at Gram Panchayat level), with block-level fixed effects. Both clustered and wild bootstrapped p-values have been estimated for each specification
4. The first column in each table reports the unadjusted base specification, i.e., the coefficient on the treatment indicator without controlling for any additional characteristics. Each subsequent column adds a set of covariates: column 2 adds those baseline covariates that were unbalanced at the 10 percent level, and column 3 controls for these baseline unbalanced characteristics as well as other relevant baseline characteristics
5. Baseline covariates unbalanced at 10 percent include: HH size, no. female HH members, HH head is General caste, HH has electricity, HH floor is made of improved material, respondent woman's husband is HH head, highest number of years of schooling in the HH (female) and dummy for respondent woman being an agricultural laborer The full list of covariates includes: all those covariates unbalanced at 10 percent; in addition, number of assets owned by the HH, caste of HH head, HH head is Muslim, 10 dummies for HH demographic structure, any female HH member has bank account, respondent woman age, dummies for respondent woman being a non-agricultural day laborer or a housewife.
6. Endline comparison arm mean values are provided for comparison

Tables 5.9–5.12 present results on health practices for the youngest child. We find no impact of the pilot on the likelihood of the pregnancy being registered with a health worker, or that the birth was in a health facility (Table 5.9), but this is perhaps unsurprising given that these two outcomes are highly prevalent even in the comparison arm. Of the comparison arm mothers, 99 percent registered their pregnancy and 83 percent of them gave birth in a private or government health facility. There is little room for improvement in these two indicators. We do not see any impact on the number of times antenatal care (ANC) was provided during pregnancy (Table 5.9).

There is no impact of the pilot on participation in the Village Health Sanitation and Nutrition Day in the three months prior to the survey, or on the likelihood of the child having an immunization card (Table 5.10). The latter practice is very widespread, even in the comparison arm, with 93 percent of the children having a health card (either seen by the enumerators or reported by the mother).

Table 5.10 Endline impact of the JEEViKA-MC pilot on Village Health Sanitation and Nutrition Day participation and health card for youngest child

	Youngest child: Improved health practices					
	Mother and youngest child participated in Village Health Sanitation and Nutrition Day in last 3 months			**Child has immunization/ health card**		
	(1)	**(2)**	**(3)**	**(1)**	**(2)**	**(3)**
Treatment dummy (= 1 if treatment Gram Panchayat)	0.016	0.019	0.017	0.008	0.005	0.005
	(0.021)	(0.020)	(0.020)	(0.021)	(0.021)	(0.021)
P-value cluster	0.455	0.359	0.399	0.722	0.830	0.816
P-value bootstrap	0.451	0.371	0.386	0.771	0.853	0.849
Comparison arm mean	0.602	0.602	0.602	0.927	0.927	0.927
Observations	801	800	800	805	804	804

Source: Authors' calculations.

Notes:

1. *p < 0.10; **p <0.05; ***p < 0.01
2. Standard errors in parentheses
3. Regression specification accounts for survey design (clustering at Gram Panchayat level), with block-level fixed effects. Both clustered and wild bootstrapped p-values have been estimated for each specification
4. The first column in each table reports the unadjusted base specification, i.e., the coefficient on the treatment indicator without controlling for any additional characteristics. Each subsequent column adds a set of covariates: column 2 adds those baseline covariates that were unbalanced at the 10 percent level, and column 3 controls for these baseline unbalanced characteristics as well as other relevant baseline characteristics
5. Baseline covariates unbalanced at 10 percent include: HH size, no. female HH members, HH head is General caste, HH has electricity, HH floor is made of improved material, respondent woman's husband is HH head, highest number of years of schooling in the HH (female) and dummy for respondent woman being an agricultural laborer. The full list of covariates includes: all those covariates unbalanced at 10 percent; in addition, the number of assets owned by the HH, caste of HH head, HH head is Muslim, 10 dummies for HH demographic structure, any female HH member has bank account, respondent woman age, dummies for respondent woman being a non-agricultural day laborer or a housewife.
6. All columns additionally control for endline values of child's age and gender dummy
7. Endline comparison arm mean values are provided for comparison

Table 5.11 Endline impact of the JEEViKA-MC pilot diarrhea treatment for youngest child

	Youngest child: Improved health practices					
	Gave ORS to child when he/she had diarrhea			**Gave zinc to child when he/she had diarrhea**		
	(1)	**(2)**	**(3)**	**(1)**	**(2)**	**(3)**
Treatment dummy (= 1 if treatment Gram Panchayat)	0.090	0.087	0.090	0.000	-0.003	-0.008
	(0.040)	(0.040)	(0.041)	(0.022)	(0.023)	(0.024)
P-value cluster	0.033**	0.040**	0.038**	0.990	0.909	0.751
P-value bootstrap	0.073*	0.078*	0.088*	0.984	0.919	0.786
Comparison arm mean	0.354	0.354	0.354	0.087	0.087	0.087
Observations	733	733	733	717	717	717

Source: Authors' calculations.

Notes:

1. *p < 0.10; **p < 0.05; ***p < 0.01
2. Standard errors in parentheses
3. Regression specification accounts for survey design (clustering at Gram Panchayat level), with block-level fixed effects. Both clustered and wild bootstrapped p-values have been estimated for each specification
4. The first column in each table reports the unadjusted base specification, i.e., the coefficient on the treatment indicator without controlling for any additional characteristics. Each subsequent column adds a set of covariates: column 2 adds those baseline covariates that were unbalanced at the 10 percent level, and column 3 controls for these baseline unbalanced characteristics as well as other relevant baseline characteristics
5. Baseline covariates unbalanced at 10 percent include: HH size, no. female HH members, HH head is General caste, HH has electricity, HH floor is made of improved material, respondent woman's husband is HH head, highest number of years of schooling in the HH (female) and dummy for respondent woman being an agricultural laborer. The full list of covariates includes: all those covariates unbalanced at 10 percent; in addition, the number of assets owned by the HH, caste of HH head, HH head is Muslim, 10 dummies for HH demographic structure, any female HH member has bank account, respondent woman age, dummies for respondent woman being a non-agricultural day laborer or a housewife.
6. All columns additionally control for endline values of child's age and gender dummy
7. Endline comparison arm mean values are provided for comparison

We do, however, see sizeable and significant impacts of the pilot on treatment of diarrhea for the youngest child (Table 5.11). In the full specification, column 3, there is an 9 pp increase in the likelihood that the mother gave ORS when the youngest child had diarrhea, which is a very large 26 percent increase over the endline comparison mean. The practice of giving zinc during diarrhea is not widespread (only 9 percent of the comparison arm mothers reported doing this) and we see no impacts of the pilot in this regard.

The results on diarrhea treatment need to be squared with the knowledge related results we presented earlier. We had shown no impact of the pilot on knowledge of child health, which included knowledge of the symptoms and treatment/prevention of diarrhea. A more detailed investigation of responses to those individual child health related knowledge questions reveals that the treatment arm does perform slightly better than the comparison arm on use of ORS (34% versus 27%) but that knowledge of zinc is very low in both arms (~6-7% only). The non-result on zinc use stems from lack of knowledge in both arms. The small impacts of use of ORS in the case of the youngest child do line up with greater knowledge among women in the treatment arm.

Finally, we see some encouraging impacts of the pilot treatment on the consumption of IFA and receipt of calcium tablets during pregnancy with the youngest child (

Table 5.12). While there was no impact on the likelihood of consuming IFA, the number of IFA tablets consumed increased significantly, with the full specification (column 3, second outcome) suggesting an increase in consumption during pregnancy by 10 tablets over a comparison arm mean of 25 tablets. This amounts to a 38 percent increase. We also see a 5 pp (p (bootstrap) < 0.10) increase in the likelihood that the mother received calcium tablets (column 3, third outcome), a 50 percent increase over the comparison arm mean; however, this impact vanishes in the full specification when we control for small clusters through bootstrapping. Finally, we see sizeable and significant impact of 2.8 pp increase in the number of days for which calcium tablets were taken (column 3, fourth outcome), which is a 90 percent increase in days of calcium tablet consumption during pregnancy over a comparison arm mean.

Overall, there appears to be some improvement in health practices relating to the youngest child. Some of these—increase in the consumption of IFA tablets and receipt of calcium tablets—are also dictated by the supply of these services, and not solely dictated by mothers' demand. It is possible that the convergence component of the pilot is responsible for strengthening of service delivery in these areas. It is also possible to triangulate the results on use of IFA with the knowledge scores of the mothers in both arms. In response to the question of the number of IFA tablets that should be consumed during pregnancy, treatment arm mothers reported higher numbers than comparison arm mothers (83 versus 71, $p<0.01$, numbers not shown), even though their awareness of the side effects was balanced across arms. Conditional on supply, greater knowledge of the importance of IFA seems to have translated into greater consumption.

Table 5.12 Endline impact of the JEEViKA-MC pilot on IFA and calcium tablet consumption

	Mothers of youngest child: Improved health practices											
	Given/received IFA tablets during pregnancy			Number of IFA tablets consumed during pregnancy			Received calcium tablets during pregnancy			Number of days for which calcium tablets were taken		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Treatment dummy (= 1 if treatment Gram Panchayat)	0.020	0.032	0.034	9.616	9.175	9.600	0.053	0.052	0.049	2.826	2.842	2.759
	(0.038)	(0.039)	(0.040)	(3.315)	(3.365)	(3.346)	(0.023)	(0.025)	(0.026)	(1.214)	(1.397)	(1.399)
P-value cluster	0.599	0.427	0.404	0.008***	0.012**	0.009***	0.032**	0.049**	0.068*	0.029**	0.054*	0.061*
P-value bootstrap	0.646	0.491	0.462	0.025**	0.035**	0.023**	0.047**	0.069*	0.090*	0.044**	0.074*	0.077*
Comparison arm mean	0.654	0.654	0.654	25.232	25.232	25.232	0.098	0.098	0.098	3.102	3.102	3.102
Observations	805	804	804	793	792	792	799	798	798	791	790	790

Source: Authors' calculations.

Notes:

1. *p < 0.10; **p < 0.05; ***p < 0.01
2. Standard errors in parentheses
3. Regression specification accounts for survey design (clustering at Gram Panchayat level), with block-level fixed effects. Both clustered and wild bootstrapped p-values have been estimated for each specification
4. The first column in each table reports the unadjusted base specification, i.e., the coefficient on the treatment indicator without controlling for any additional characteristics. Each subsequent column adds a set of covariates: column 2 adds those baseline covariates that were unbalanced at the 10 percent level, and column 3 controls for these baseline unbalanced characteristics as well as other relevant baseline characteristics
5. Baseline covariates unbalanced at 10 percent include: HH size, no. female HH members, HH head is General caste, HH has electricity, HH floor is made of improved material, respondent woman's husband is HH head, highest number of years of schooling in the HH (female) and dummy for respondent woman being an agricultural laborer. The full list of covariates includes: all those covariates unbalanced at 10 percent; in addition, the number of assets owned by the HH, caste of HH head, HH head is Muslim, 10 dummies for HH demographic structure, any female HH member has bank account, respondent woman age, dummies for respondent woman being a non-agricultural day laborer or a housewife.
6. Endline comparison arm mean values are provided for comparison

5.1.4. Hygiene and sanitation practices, including handwashing and use of latrines

The next set of secondary outcomes for which we report results relates to sanitation practices. These include: an indicator for the household always treating water to make it safe to drink, using the correct practice to treat water, using correct materials to wash hands, using an improved drinking water source, disposing of children's stools correctly, and using an improved toilet.

The proportions of households practicing these in both treatment and comparison arms are given in Figure 5-3. While the proportions that report using the right materials to wash hands and having an improved drinking water source are high, above 95 percent, the proportion of households that correctly dispose of children's stools or treat water to make it safe to drink is very low. Conditional on treating water, about 70 percent or more households use the correct practice. The treatment arm does better than the control on several of these indicators, though the differences are small.

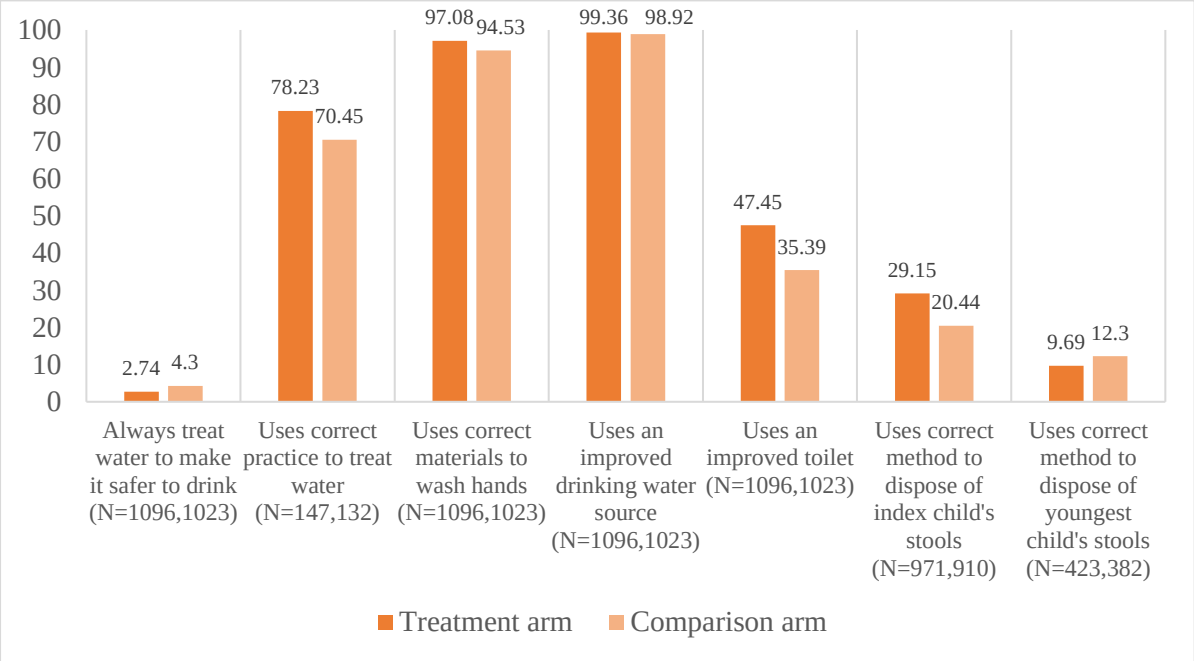

Figure 5-3 Proportion of households that engage in correct sanitation and hygiene practices at endline, by treatment arm

To further investigate whether the differences we see descriptively are also statistically significant, we present the impact estimates for these hygiene and sanitation practices (Table 5.13 and Table 5.14). After controlling for the full set of covariates, we do not see significant impacts of the treatment except in correct handwashing practices, and here too the impact is small. We estimate an increase of only 3 pp, which is a 3.1 percent increase over the mean in the comparison arm.

The lack of significant differences in WASH-related practices is in coherence with the sanitation-related knowledge scores of section 5.1.2. There we saw no significant differences in sanitation knowledge between the treatment and comparison arms. The components of sanitation knowledge included awareness of effects of open defecation, benefits of constructing a toilet, making drinking water safe, ways to store drinking water, when to wash hands, and knowledge of correct materials to use to wash hands. Differences in knowledge on these topics across arms were very small, and, barring treatment of drinking water, more than 80% of the women in both treatment and comparison arms reported at least one correct answer to each set of questions. The high level of knowledge about sanitation in both arms is likely a result of a concerted push to improve sanitation by the Bihar government.

Table 5.13 mpact of JEEViKA-MC pilot on practices related to drinking water and handwashing

	Improved sanitation practices											
	Always treat water to make it safe to drink			Use correct practice to treat water			Correct handwashing practices			Improved drinking water source		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Treatment dummy (= 1 if treatment Gram Panchayat)	−0.018	−0.018	−0.017	0.091	0.068	0.068	0.026	0.026	0.027	0.004	0.004	0.003
	(0.013)	(0.013)	(0.013)	(0.068)	(0.072)	(0.070)	(0.012)	(0.011)	(0.012)	(0.004)	(0.004)	(0.004)
P-value cluster	0.171	0.180	0.216	0.196	0.351	0.341	0.040**	0.032**	0.033**	0.425	0.411	0.449
P-value bootstrap	0.207	0.215	0.259	0.256	0.400	0.396	0.073*	0.056*	0.058*	0.479	0.457	0.492
Comparison arm mean	0.043	0.043	0.043	0.705	0.705	0.705	0.945	0.945	0.945	0.989	0.989	0.989
Observations	2,119	2,114	2,114	279	278	278	2,119	2,114	2,114	2,119	2,114	2,114

Source: Authors' calculations.

Notes:

1. *p < 0.10; **p < 0.05; ***p < 0.01
2. Standard errors in parentheses
3. Regression specification accounts for survey design (clustering at Gram Panchayat level), with block-level fixed effects. Both clustered and wild bootstrapped p-values have been estimated for each specification
4. The first column in each table reports the unadjusted base specification, i.e., the coefficient on the treatment indicator without controlling for any additional characteristics. Each subsequent column adds a set of covariates: column 2 adds those baseline covariates that were unbalanced at the 10 percent level, and column 3 controls for these baseline unbalanced characteristics as well as other relevant baseline characteristics
5. Baseline covariates unbalanced at 10 percent include: HH size, no. female HH members, HH head is General caste, HH has electricity, HH floor is made of improved material, respondent woman's husband is HH head, highest number of years of schooling in the HH (female) and dummy for respondent woman being an agricultural laborer. The full list of covariates includes: all those covariates unbalanced at 10 percent; in addition, the number of assets owned by the HH, caste of HH head, HH head is Muslim, 10 dummies for HH demographic structure, any female HH member has bank account, respondent woman age, dummies for respondent woman being a non-agricultural day laborer or a housewife.
6. Endline comparison arm mean values are provided for comparison

Table 5.14 Impact of JEEViKA-MC pilot on sanitation-related practices

	Improved sanitation practices								
	Improved toilet			**Correct disposal of index child's stool**			**Correct disposal of youngest child's stool**		
	(1)	**(2)**	**(3)**	**(1)**	**(2)**	**(3)**	**(1)**	**(2)**	**(3)**
Treatment dummy (= 1 if treatment Gram Panchayat)	0.078	0.052	0.059	0.058	0.041	0.050	−0.030	−0.043	−0.045
	(0.059)	(0.062)	(0.062)	(0.040)	(0.040)	(0.042)	(0.034)	(0.033)	(0.032)
P-value cluster	0.197	0.410	0.356	0.157	0.314	0.245	0.387	0.209	0.178
P-value bootstrap	0.209	0.422	0.369	0.168	0.318	0.256	0.427	0.258	0.224
Comparison arm mean	0.354	0.354	0.354	0.204	0.204	0.204	0.123	0.123	0.123
Observations	2,119	2,114	2,114	1,881	1,878	1,878	805	804	804

Source: Authors' calculations.

Notes:

1. *p < 0.10; **p < 0.05; ***p < 0.01
2. Standard errors in parentheses
3. Regression specification accounts for survey design (clustering at Gram Panchayat level), with block-level fixed effects. Both clustered and wild bootstrapped p-values have been estimated for each specification
4. The first column in each table reports the unadjusted base specification, i.e., the coefficient on the treatment indicator without controlling for any additional characteristics. Each subsequent column adds a set of covariates: column 2 adds those baseline covariates that were unbalanced at the 10 percent level, and column 3 controls for these baseline unbalanced characteristics as well as other relevant baseline characteristics
5. Baseline covariates unbalanced at 10 percent include: HH size, no. female HH members, HH head is General caste, HH has electricity, HH floor is made of improved material, respondent woman's husband is HH head, highest number of years of schooling in the HH (female) and dummy for respondent woman being an agricultural laborer. The full list of covariates includes: all those covariates unbalanced at 10 percent; in addition, the number of assets owned by the HH, caste of HH head, HH head is Muslim, 10 dummies for HH demographic structure, any female HH member has bank account, respondent woman age, dummies for respondent woman being a non-agricultural day laborer or a housewife.
6. Columns on disposal of correct disposal of child's stool additionally control for endline values of child's age and gender dummy
7. Endline comparison arm mean values are provided for comparison

5.2. Child-level Outcomes

5.2.1. IYCF practices for the youngest child < 2 years

For the youngest children under the age of 2 years we calculate core and optional IYCF indicators. The core indicators include early initiation of breastfeeding; continued breastfeeding at 1 year; introduction of solid, semi-solid, or soft food; MDD; and consumption of iron-rich food. The optional indicators include ever breastfed and continued breastfeeding at 2 years. At endline, the proportion of youngest children meeting these core and optional indicators is given in Figure 5-4. Adherence to IYCF recommendations of continued breastfeeding at 1 year; introduction of solid, semi-solid, or soft food; ever breastfed; and continued breastfeeding at 2 years is high, but the proportion of children who meet MDD or consume iron-rich food is quite low. The treatment arm appears to be doing better on all indicators except continued breastfeeding at 1 year, though the differences are small.

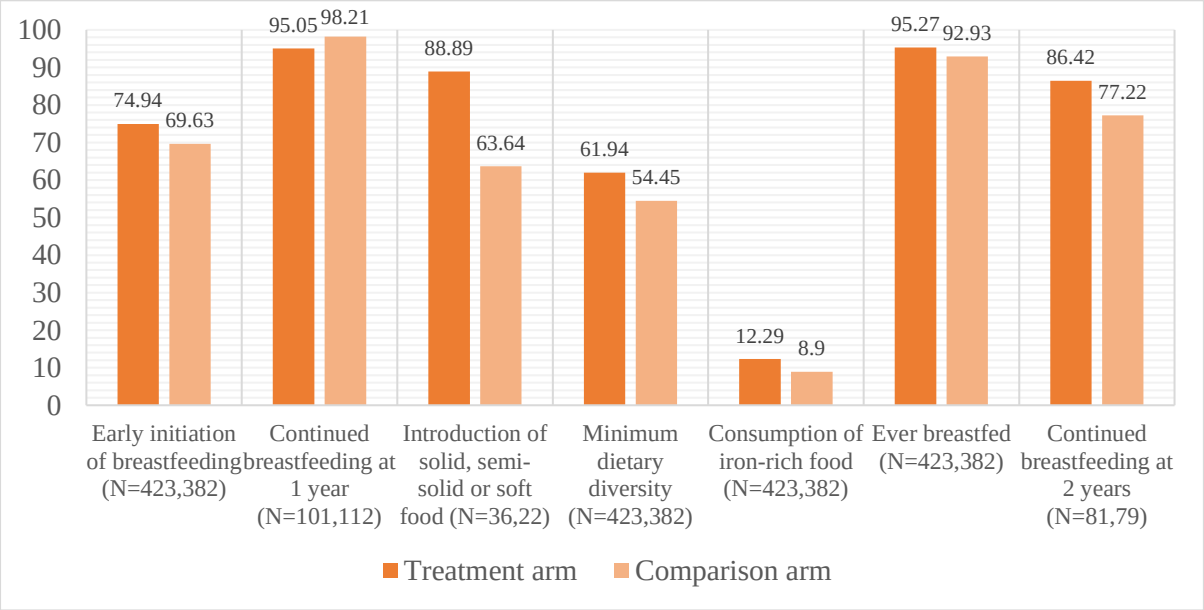

Figure 5-4 Proportion of youngest children meeting core and optional IYCF recommendations at endline, by treatment arm

Table 5.15 and Table 5.16 present estimates of the impact of the treatment on IYCF practices for the youngest child under the age of 2 years. These have been separated into core and optional practices. For the core practices (Table 5.15), we find no impact of the pilot on early initiation of breastfeeding or continued breastfeeding at 1 year; however, both practices are reasonably widespread even among women in the comparison arm. We do find a large and significant impact on the introduction of solid, semi-solid, or soft food (columns 1–3, third outcome), with the full specification estimates pointing to a 36 pp increase, a 56 percent improvement over the comparison arm mean. However, the sample size is very small for this indicator, so interpretation should be made with caution. No impacts are observed on the achievement of MDD or the consumption of iron-rich food (fourth and fifth core IYCF outcome).

The pilot does not appear to have had an impact on the likelihood of the child being ever breastfed (columns 1–3 of first outcome, Table 5.16), but we do see an impact on the likelihood of continued breastfeeding at 2 years. The full specification (column 3 of second outcome) suggests a 13 pp increase in the likelihood of the youngest child being breastfed at 2 years, a sizeable 17 percent increase over the comparison arm mean. It is worth noting here, however, that since this indicator is calculated for children between the ages of 20 and 24 months, the sample size is small, and estimates should be interpreted with caution.

Table 5.15 Impact of JEEViKA-MC pilot on core IYCF indicators for youngest child

	Youngest child: Improved IYCF practices														
	Early initiation of breastfeeding			Continued breastfeeding at 1 year			Introduction of solid, semi-solid, or soft food			Minimum dietary diversity			Consumption of iron-rich food		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Treatment dummy (= 1 if treatment Gram Panchayat)	0.038	0.027	0.021	-0.034	-0.022	-0.017	0.253	0.284	0.363	0.077	0.063	0.076	0.031	0.032	0.029
	(0.048)	(0.048)	(0.049)	(0.020)	(0.019)	(0.023)	(0.145)	(0.127)	(0.141)	(0.048)	(0.048)	(0.048)	(0.029)	(0.028)	(0.031)
P-value cluster	0.439	0.570	0.677	0.099*	0.265	0.460	0.096*	0.037**	0.018**	0.123	0.200	0.125	0.296	0.267	0.364
P-value bootstrap	0.469	0.604	0.726	0.125	0.261	0.496	0.159	0.074*	0.053*	0.168	0.242	0.177	0.352	0.324	0.418
Comparison arm mean	0.696	0.696	0.696	0.982	0.982	0.982	0.636	0.636	0.636	0.545	0.545	0.545	0.089	0.089	0.089
Observations	805	804	804	213	213	213	58	58	58	805	804	804	805	804	804

Source: Authors' calculations.

Notes:

1. *p < 0.10; **p < 0.05; ***p < 0.01
2. Standard errors in parentheses
3. Regression specification accounts for survey design (clustering at Gram Panchayat level), with block-level fixed effects. Both clustered and wild bootstrapped p-values have been estimated for each specification
4. The first column in each table reports the unadjusted base specification, i.e., the coefficient on the treatment indicator without controlling for any additional characteristics. Each subsequent column adds a set of covariates: column 2 adds those baseline covariates that were unbalanced at the 10 percent level, and column 3 controls for these baseline unbalanced characteristics as well as other relevant baseline characteristics
5. Baseline covariates unbalanced at 10 percent include: HH size, no. female HH members, HH head is General caste, HH has electricity, HH floor is made of improved material, respondent woman's husband is HH head, highest number of years of schooling in the HH (female) and dummy for respondent woman being an agricultural laborer. The full list of covariates includes: all those covariates unbalanced at 10 percent; in addition, the number of assets owned by the HH, caste of HH head, HH head is Muslim, 10 dummies for HH demographic structure, any female HH member has bank account, respondent woman age, dummies for respondent woman being a non-agricultural day laborer or a housewife.
6. All columns additionally control for endline values of child's age and gender dummy
7. Endline comparison arm mean values are provided for comparison

Table 5.16 Impact of JEEViKA-MC pilot on optional IYCF indicators for the youngest child

	Youngest child: Improved IYCF practices					
	Ever breastfed			Continued breastfeeding at 2 years		
	(1)	(2)	(3)	(1)	(2)	(3)
Treatment dummy (= 1 if treatment Gram Panchayat)	0.021	0.022	0.023	0.090	0.136	0.132
	(0.019)	(0.021)	(0.021)	(0.054)	(0.056)	(0.052)
P-value cluster	0.269	0.307	0.283	0.110	0.024**	0.019**
P-value bootstrap	0.289	0.322	0.296	0.115	0.026**	0.023**
Comparison arm mean	0.929	0.929	0.929	0.772	0.772	0.772
Observations	805	804	804	160	160	160

Source: Authors' calculations.

Notes:

1. *p < 0.10; **p < 0.05; ***p < 0.01
2. Standard errors in parentheses
3. Regression specification accounts for survey design (clustering at Gram Panchayat level), with block-level fixed effects. Both clustered and wild bootstrapped p-values have been estimated for each specification
4. The first column in each table reports the unadjusted base specification, i.e., the coefficient on the treatment indicator without controlling for any additional characteristics. Each subsequent column adds a set of covariates: column 2 adds those baseline covariates that were unbalanced at the 10 percent level, and column 3 controls for these baseline unbalanced characteristics as well as other relevant baseline characteristics
5. Baseline covariates unbalanced at 10 percent include: HH size, no. female HH members, HH head is General caste, HH has electricity, HH floor is made of improved material, respondent woman's husband is HH head, highest number of years of schooling in the HH (female) and dummy for respondent woman being an agricultural laborer. The full list of covariates includes: all those covariates unbalanced at 10 percent; in addition, the number of assets owned by the HH, caste of HH head, HH head is Muslim, 10 dummies for HH demographic structure, any female HH member has bank account, respondent woman age, dummies for respondent woman being a non-agricultural day laborer or a housewife.
6. All columns additionally control for endline values of child's age and gender dummy
7. Endline comparison arm mean values are provided for comparison

The reader might recall that we saw a positive and significant impact of the pilot on child feeding knowledge. When this composite knowledge score is disaggregated, and the individual knowledge questions tabulated (numbers not shown here), we find that the treatment arm women demonstrate better knowledge of early initiation of breastfeeding, colostrum feeding and length of continued breastfeeding, though their knowledge of the length of exclusive breastfeeding was very well balanced. Some of the differences in knowledge can be traced to differences in practices as well.

5.2.2. Anthropometry among children

We present results on the anthropometry for both index and youngest children. For index children, we have information on anthropometry from baseline, and these values are included as covariates in all regression models. In all regressions, we control for both child age and gender.

Index child

At baseline the mean HAZ for the index children under 2 years was –1.98 (± 1.43), the mean WAZ was –2.01 (± 1.22), and the mean WHZ was –1.30 (± 1.27) across both arms (Table 5.17).

Table 5.17 Anthropometry Z-scores, at baseline

	Overall		
Index child	**Mean/ Proportion**	**Standard deviation**	**N**
Height-for-age Z-score (HAZ)	−1.98	1.43	1,837
Weight-for-age Z-score (WAZ)	−2.01	1.22	1,854
Weight-for-height Z-score (WHZ)	−1.30	1.27	1,846

Source: Authors' calculations.
Legend: *p < 0.10; **p < 0.05; ***p < 0.01

At endline we find no impact of the pilot interventions on child anthropometric Z-scores for the index child (Table 5.18). Regardless of specification, the impact estimates remain negative and insignificant.

Table 5.18 Impact of the JEEViKA-MC pilot on the anthropometric Z-scores of the index child

	Index child: Anthropometric Z-scores								
	Height-for-age Z-score			Weight-for-age Z-score			Weight-for-height Z-score		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Treatment dummy (= 1 if treatment Gram Panchayat)	−0.030	−0.033	−0.036	0.002	−0.001	−0.003	−0.022	−0.017	−0.017
	(0.047)	(0.044)	(0.046)	(0.036)	(0.038)	(0.038)	(0.055)	(0.055)	(0.058)
P-value cluster	0.540	0.462	0.436	0.961	0.982	0.928	0.688	0.766	0.764
P-value bootstrap	0.584	0.535	0.506	0.968	0.967	0.946	0.690	0.767	0.763
Comparison arm mean	−2.002	−2.002	−2.002	−2.013	−2.013	−2.013	−1.268	−1.268	−1.268
Observations	1,837	1,835	1,835	1,854	1,852	1,852	1,846	1,844	1,844

Source: Authors' calculations.

Notes:

1. *p < 0.10; **p < 0.05; ***p < 0.01
2. Standard errors in parentheses
3. Regression specification accounts for survey design (clustering at Gram Panchayat level), with block-level fixed effects. Both clustered and wild bootstrapped p-values have been estimated for each specification
4. The first column in each table reports the unadjusted base specification, i.e., the coefficient on the treatment indicator without controlling for any additional characteristics. Each subsequent column adds a set of covariates: column 2 adds those baseline covariates that were unbalanced at the 10 percent level, and column 3 controls for these baseline unbalanced characteristics as well as other relevant baseline characteristics
5. Baseline covariates unbalanced at 10 percent include: HH size, no. female HH members, HH head is General caste, HH has electricity, HH floor is made of improved material, respondent woman's husband is HH head, highest number of years of schooling in the HH (female) and dummy for respondent woman being an agricultural laborer. The full list of covariates includes: all those covariates unbalanced at 10 percent; in addition, the number of assets owned by the HH, caste of HH head, HH head is Muslim, 10 dummies for HH demographic structure, any female HH member has bank account, respondent woman age, dummies for respondent woman being a non-agricultural day laborer or a housewife.
6. All columns control for baseline values of the outcome variable
7. All columns additionally control for endline values of child's age and gender dummy
8. Baseline comparison arm mean values are provided for comparison

Using the Z-scores for each child we create indicators for stunting (HAZ <- 2), wasting (WHZ <- 2) and underweight (WAZ <- 2). For the index children, the proportion of children falling into each category is presented by arm and over time in Figure 5-5. We see that there is very little difference in these proportions by arm. The proportion of children stunted has increased quite dramatically between baseline and endline. Since these are the same children followed two-and-a-half years later, this might be the result of the deterioration with child age that we documented in our baseline report.

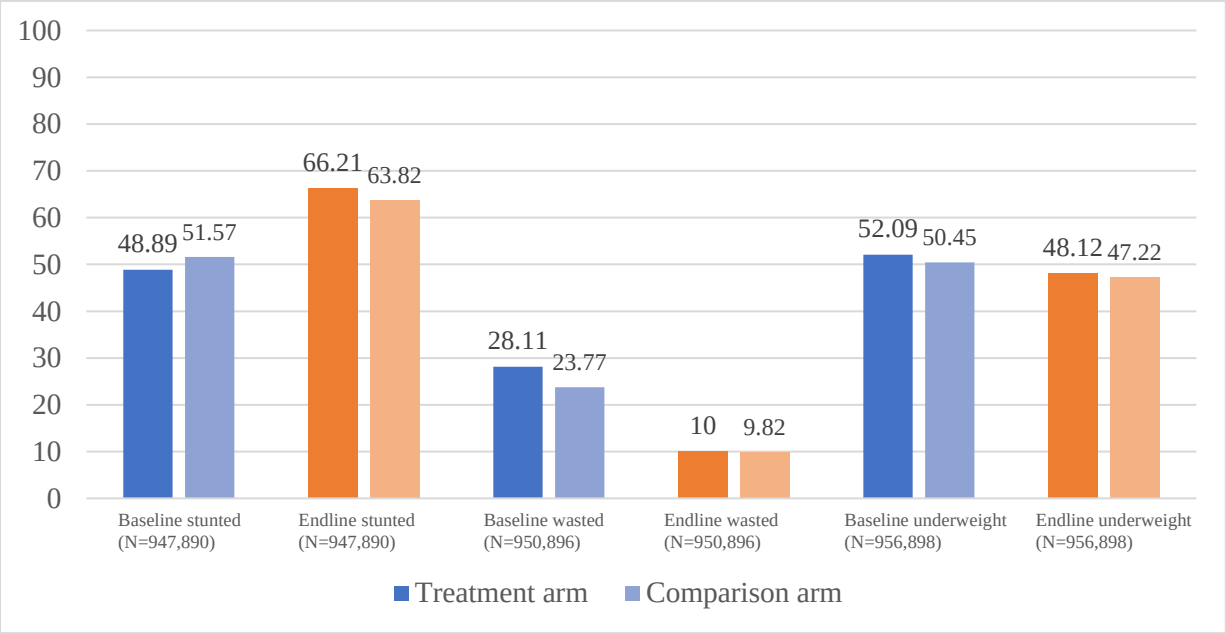

Figure 5-5 Proportion of index children stunted, wasted, or underweight at baseline and endline, by treatment arm

The impact estimates for the regressions of indicators for wasting and underweight for the index child also show no positive impact of the pilot (Table 5.19). However, we see an *increase* in the likelihood of being stunted for all specifications (columns 1–3), though this effect is significant only at the 10 percent level when we control for small clusters through bootstrapping with all controls added in (column 3, first outcome).

Table 5.19 Impact of the JEEViKA-MC pilot on likelihood of index child being stunted, wasted, or underweight

	Index child: Anthropometric indicators								
	Stunted			Wasted			Underweight		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Treatment dummy (= 1 if treatment Gram Panchayat)	0.048	0.049	0.045	−0.006	−0.007	−0.006	−0.006	−0.005	−0.006
	(0.023)	(0.021)	(0.021)	(0.018)	(0.018)	(0.018)	(0.022)	(0.022)	(0.023)
P-value cluster	0.048**	0.031**	0.045**	0.741	0.697	0.726	0.786	0.807	0.791
P-value bootstrap	0.064*	0.048**	0.066*	0.750	0.681	0.727	0.816	0.825	0.815
Comparison arm mean	0.516	0.516	0.516	0.238	0.238	0.238	0.504	0.504	0.504
Observations	1,837	1,835	1,835	1,846	1,844	1,844	1,854	1,852	1,852

Source: Authors' calculations.

Notes:

1. *p < 0.10; **p < 0.05; ***p < 0.01
2. Standard errors in parentheses
3. Regression specification accounts for survey design (clustering at Gram Panchayat level), with block-level fixed effects. Both clustered and wild bootstrapped p-values have been estimated for each specification
4. The first column in each table reports the unadjusted base specification, i.e., the coefficient on the treatment indicator without controlling for any additional characteristics. Each subsequent column adds a set of covariates: column 2 adds those baseline covariates that were unbalanced at the 10 percent level, and column 3 controls for these baseline unbalanced characteristics as well as other relevant baseline characteristics
5. Baseline covariates unbalanced at 10 percent include: HH size, no. female HH members, HH head is General caste, HH has electricity, HH floor is made of improved material, respondent woman's husband is HH head, highest number of years of schooling in the HH (female) and dummy for respondent woman being an agricultural laborer. The full list of covariates includes: all those covariates unbalanced at 10 percent; in addition, number of assets owned by the HH, caste of HH head, HH head is Muslim, 10 dummies for HH demographic structure, any female HH member has bank account, respondent woman age, dummies for respondent woman being a non-agricultural day laborer or a housewife.
6. All columns control for baseline values of the outcome variable
7. All columns additionally control for endline values of child's age and gender dummy
8. Baseline comparison arm mean values are provided for comparison

Youngest child

We present the same set of results for the youngest child under two years at the time of the endline survey. Figure 5-6 shows the proportion of these children who are stunted, wasted, or underweight. The proportion that is stunted is lower than for the index children, which again might be a mechanical function of the fact that these children are younger. There do not appear to be large differences between treatment and comparison arms.

For both the Z-scores and for indicators for stunting, wasting, and underweight the impact estimates are insignificant regardless of the specification employed (Table 5.20 andTable 5.21). There appears to be no impact of the pilot interventions on child anthropometry for either the index or youngest children.

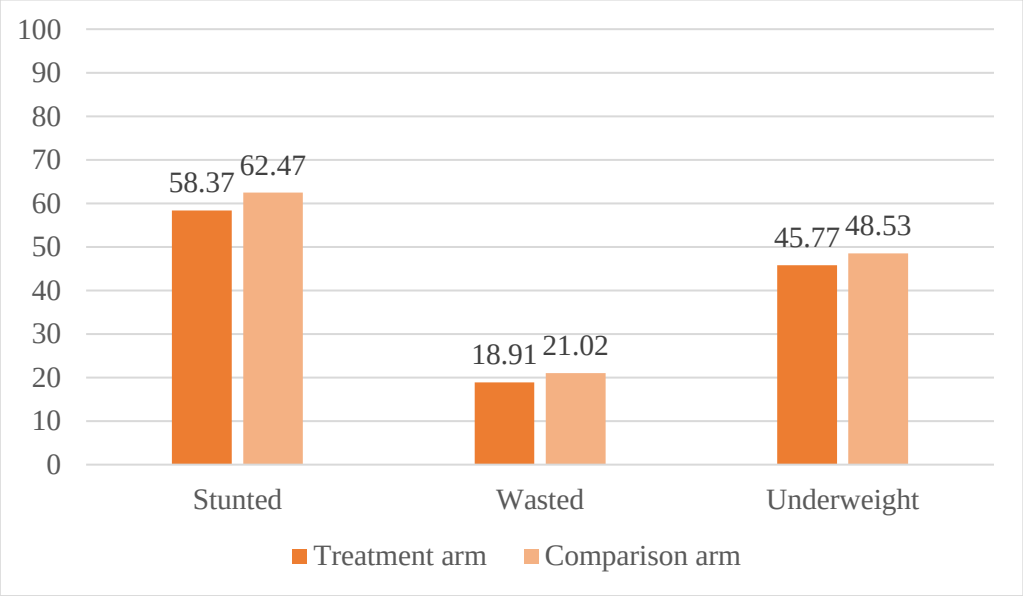

Figure 5-6 Proportion of youngest children stunted, wasted, or underweight at endline, by treatment arm

Table 5.20 Endline impact of the JEEViKA-MC pilot on the anthropometric Z-scores of the youngest child

	Youngest child: Anthropometric Z-scores								
	Height-for-age Z-score			**Weight-for-age Z-score**			**Weight-for-height Z-score**		
	(1)	**(2)**	**(3)**	**(1)**	**(2)**	**(3)**	**(1)**	**(2)**	**(3)**
Treatment dummy (= 1 if treatment Gram Panchayat)	0.040	−0.020	0.010	0.040	−0.004	0.022	−0.021	−0.049	−0.041
	(0.084)	(0.091)	(0.088)	(0.065)	(0.072)	(0.063)	(0.081)	(0.086)	(0.080)
P-value cluster	0.639	0.831	0.911	0.545	0.953	0.729	0.794	0.576	0.613
P-value bootstrap	0.625	0.850	0.921	0.545	0.950	0.740	0.818	0.583	0.631
Comparison arm mean	−2.370	−2.370	−2.370	−2.023	−2.023	−2.023	−1.028	−1.028	−1.028
Observations	779	779	779	775	775	775	773	773	773

Source: Authors' calculations.

Notes:

1. *p < 0.10; **p < 0.05; ***p < 0.01
2. Standard errors in parentheses
3. Regression specification accounts for survey design (clustering at Gram Panchayat level), with block-level fixed effects. Both clustered and wild bootstrapped p-values have been estimated for each specification
4. The first column in each table reports the unadjusted base specification, i.e., the coefficient on the treatment indicator without controlling for any additional characteristics. Each subsequent column adds a set of covariates: column 2 adds those baseline covariates that were unbalanced at the 10 percent level, and column 3 controls for these baseline unbalanced characteristics as well as other relevant baseline characteristics
5. Baseline covariates unbalanced at 10 percent include: HH size, no. female HH members, HH head is General caste, HH has electricity, HH floor is made of improved material, respondent woman's husband is HH head, highest number of years of schooling in the HH (female) and dummy for respondent woman being an agricultural laborer. The full list of covariates includes: all those covariates unbalanced at 10 percent; in addition, the number of assets owned by the HH, caste of HH head, HH head is Muslim, 10 dummies for HH demographic structure, any female HH member has bank account, respondent woman age, dummies for respondent woman being a non-agricultural day laborer or a housewife.
6. All columns additionally control for endline values of child's age and gender dummy
7. Endline comparison arm mean values are provided for comparison

Table 5.21 Impact of the JEEViKA-MC pilot on likelihood of youngest child being stunted, wasted, or underweight

	Youngest child: Anthropometric indicators								
	Stunted			Wasted			Underweight		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Treatment dummy (= 1 if treatment Gram Panchayat)	−0.006	0.017	0.015	−0.027	−0.018	−0.023	−0.014	0.015	0.007
	(0.032)	(0.035)	(0.032)	(0.029)	(0.027)	(0.022)	(0.025)	(0.025)	(0.023)
P-value cluster	0.862	0.627	0.652	0.350	0.514	0.302	0.586	0.548	0.761
P-value bootstrap	0.877	0.659	0.683	0.390	0.564	0.340	0.606	0.571	0.763
Comparison arm mean	0.625	0.625	0.625	0.210	0.210	0.210	0.485	0.485	0.485
Observations	779	779	779	773	773	773	775	775	775

Source: Authors' calculations.

Notes:

1. *p < 0.10; **p < 0.05; ***p < 0.01
2. Standard errors in parentheses
3. Regression specification accounts for survey design (clustering at Gram Panchayat level), with block-level fixed effects. Both clustered and wild bootstrapped p-values have been estimated for each specification
4. The first column in each table reports the unadjusted base specification, i.e., the coefficient on the treatment indicator without controlling for any additional characteristics. Each subsequent column adds a set of covariates: column 2 adds those baseline covariates that were unbalanced at the 10 percent level, and column 3 controls for these baseline unbalanced characteristics as well as other relevant baseline characteristics
5. Baseline covariates unbalanced at 10 percent include: HH size, no. female HH members, HH head is General caste, HH has electricity, HH floor is made of improved material, respondent woman's husband is HH head, highest number of years of schooling in the HH (female) and dummy for respondent woman being an agricultural laborer. The full list of covariates includes: all those covariates unbalanced at 10 percent; in addition, the number of assets owned by the HH, caste of HH head, HH head is Muslim, 10 dummies for HH demographic structure, any female HH member has bank account, respondent woman age, dummies for respondent woman being a non-agricultural day laborer or a housewife.
6. All columns additionally control for endline values of child's age and gender dummy
7. Endline comparison arm mean values are provided for comparison

5.2.3. Morbidity among children

Morbidity among children was one of the key secondary outcomes of this pilot. Here we present results both for the index child (above the age of 2 years) and for the youngest child under the age of 2 years (Table 5.22 and Table 5.23). In two cases—fast/short breathing and cough—we do we not find an impact of the pilot on the likelihood of the index child suffering from conditions of ill-health. However, we do find a 4.5 pp increase in the likelihood of the index child suffering from diarrhea (columns 2 and 3 of second outcome, Table 5.22).

In the case of the youngest child, we find a 9 pp increase in the likelihood of the child suffering from a cough (column 3 of outcome 2, Table 5.23) and a 5.7 pp increase in the likelihood of suffering from fever (columns 1 and 3 of second outcome, Table 5.23), all significant at the 10 percent level. It is also worrying to note that close to 70 percent of the index and youngest children suffered from cough or fever in the reference period. Part of this might be attributed to seasonality, since the survey was conducted at the start of the cold season.

Table 5.22 Impact of JEEViKA-MC pilot on morbidity indicators for index child

	Index child: Morbidity in last 2 weeks											
	Fast breathing			Cough			Diarrhea			Fever		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Treatment dummy (= 1 if treatment Gram Panchayat)	−0.007	−0.008	−0.007	0.027	0.028	0.028	0.045	0.050	0.048	−0.010	−0.007	−0.008
	(0.013)	(0.013)	(0.013)	(0.023)	(0.023)	(0.024)	(0.030)	(0.029)	(0.028)	(0.019)	(0.020)	(0.021)
P-value cluster	0.593	0.546	0.575	0.246	0.239	0.249	0.151	0.096*	0.099*	0.622	0.711	0.701
P-value bootstrap	0.618	0.579	0.590	0.283	0.282	0.301	0.159	0.092*	0.099*	0.612	0.705	0.692
Comparison arm mean	0.056	0.056	0.056	0.735	0.735	0.735	0.232	0.232	0.232	0.710	0.710	0.710
Observations	1,880	1,877	1,877	1,880	1,877	1,877	1,879	1,876	1,876	1,880	1,877	1,877

Source: Authors' calculations.

Notes:

1. *p < 0.10; **p < 0.05; ***p < 0.01
2. Standard errors in parentheses
3. Regression specification accounts for survey design (clustering at Gram Panchayat level), with block-level fixed effects. Both clustered and wild bootstrapped p-values have been estimated for each specification
4. The first column in each table reports the unadjusted base specification, i.e., the coefficient on the treatment indicator without controlling for any additional characteristics. Each subsequent column adds a set of covariates: column 2 adds those baseline covariates that were unbalanced at the 10 percent level, and column 3 controls for these baseline unbalanced characteristics as well as other relevant baseline characteristics
5. Baseline covariates unbalanced at 10 percent include: HH size, no. female HH members, HH head is General caste, HH has electricity, HH floor is made of improved material, respondent woman's husband is HH head, highest number of years of schooling in the HH (female) and dummy for respondent woman being an agricultural laborer. The full list of covariates includes: all those covariates unbalanced at 10 percent; in addition, the number of assets owned by the HH, caste of HH head, HH head is Muslim, 10 dummies for HH demographic structure, any female HH member has bank account, respondent woman age, dummies for respondent woman being a non-agricultural day laborer or a housewife.
6. All columns additionally control for endline values of child's age and gender dummy
7. Endline comparison arm mean values are provided for comparison

Table 5.23 Impact of JEEViKA-MC pilot on morbidity indicators for the youngest child

	Youngest child: Morbidity in last 2 weeks											
	Fast breathing			Cough			Diarrhea			Fever		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Treatment dummy (= 1 if treatment Gram Panchayat)	−0.018	−0.016	−0.020	0.053	0.051	0.059	0.057	0.062	0.055	0.052	0.050	0.057
	(0.014)	(0.014)	(0.014)	(0.033)	(0.035)	(0.034)	(0.046)	(0.044)	(0.042)	(0.029)	(0.030)	(0.030)
P-value cluster	0.210	0.257	0.174	0.127	0.159	0.090*	0.226	0.169	0.197	0.083*	0.111	0.068*
P-value bootstrap	0.268	0.319	0.240	0.137	0.167	0.102	0.248	0.192	0.212	0.095*	0.121	0.078*
Comparison arm mean	0.063	0.063	0.063	0.728	0.728	0.728	0.246	0.246	0.246	0.678	0.678	0.678
Observations	805	804	804	805	804	804	805	804	804	805	804	804

Source: Authors' calculations.

Notes:

1. *p < 0.10; **p < 0.05; ***p < 0.01
2. Standard errors in parentheses
3. Regression specification accounts for survey design (clustering at Gram Panchayat level), with block-level fixed effects. Both clustered and wild bootstrapped p-values have been estimated for each specification
4. The first column in each table reports the unadjusted base specification, i.e., the coefficient on the treatment indicator without controlling for any additional characteristics. Each subsequent column adds a set of covariates: column 2 adds those baseline covariates that were unbalanced at the 10 percent level, and column 3 controls for these baseline unbalanced characteristics as well as other relevant baseline characteristics
5. Baseline covariates unbalanced at 10 percent include: HH size, no. female HH members, HH head is General caste, HH has electricity, HH floor is made of improved material, respondent woman's husband is HH head, highest number of years of schooling in the HH (female) and dummy for respondent woman being an agricultural laborer. The full list of covariates includes: all those covariates unbalanced at 10 percent; in addition, the number of assets owned by the HH, caste of HH head, HH head is Muslim, 10 dummies for HH demographic structure, any female HH member has bank account, respondent woman age, dummies for respondent woman being a non-agricultural day laborer or a housewife.
6. All columns additionally control for endline values of child's age and gender dummy
7. Endline comparison arm mean values are provided for comparison

5.3. Household

5.3.1. Household food security measured by HFIAS

A key immediate determinant of health outcomes is food security within the household. To assess this, we administered HFIAS, developed and validated by the Food and Agriculture Organization (FAO). This scale is a series of nine questions about the experience of different aspects of food insecurity. If anyone in the household has experienced one of those aspects in the months preceding the survey, a follow-up question is asked about the number of times this was experienced. These questions are then used to calculate both an overall food insecurity score (which ranges from 0 to 27, a higher score indicating greater food insecurity) and indicators for three separate HFIAS domains—anxiety and uncertainty, insufficient food quality, and insufficient food quantity.

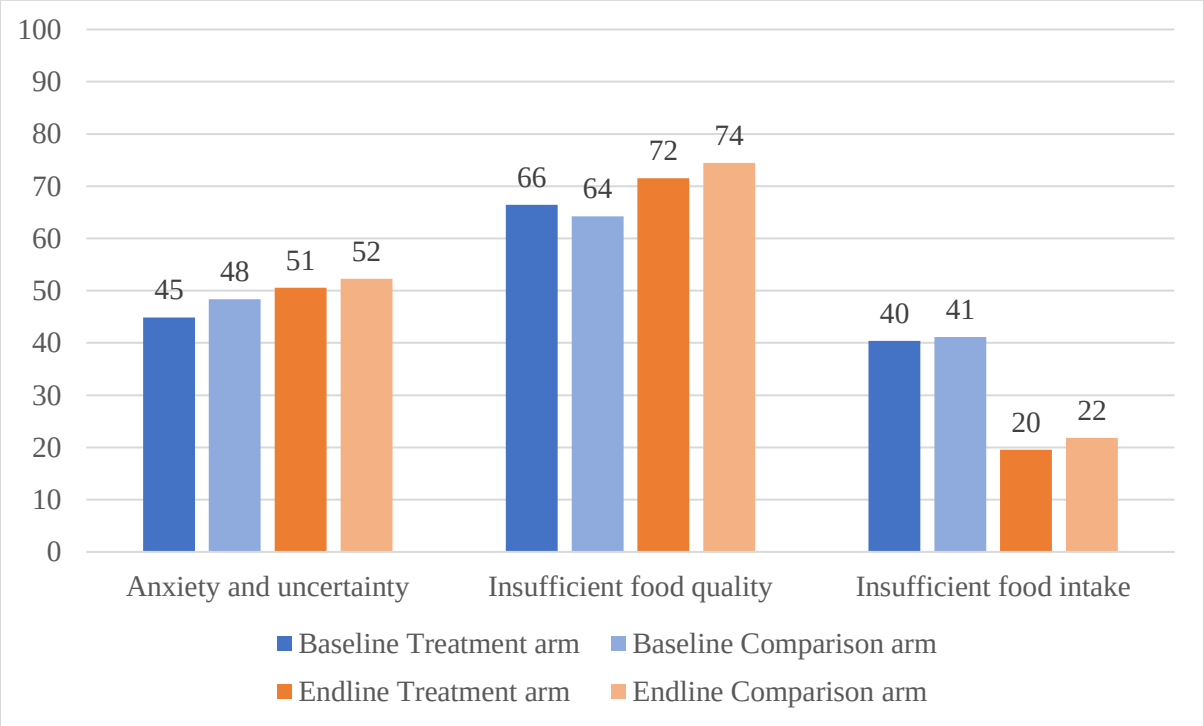

Figure 5-7 Proportion of households experiencing the HFIAS conditions at baseline and endline, by treatment arm

At baseline more than 40 percent of the households in both arms experienced food insecurity as measured by the three HFIAS domains (Figure 5-7), indicating that this population is highly food insecure. Surprisingly, the proportions experiencing anxiety and uncertainty and insufficient quality actually *increased* in both arms by the endline. However, the most extreme form of food insecurity—insufficient food intake or quantity—declined substantially in both arms by endline. There do not appear to be large differences across arms at either baseline or endline.

Given this descriptive finding, it is unsurprising that we find no impact of the pilot on the experience of food insecurity by the households in the treatment arm in any domain (Table 5.24). The columns present estimates for the household having experienced any of the three domains and, finally, on the overall score on the scale. While the impact estimates for the overall score have the expected negative sign, indicating an improvement in food security status, they are not statistically significant in any of the specifications.

Table 5.24 Impact of JEEViKA-MC pilot on household food insecurity indicators and overall score

	Household food insecurity outcome											
	HH food insecurity: anxiety and uncertainty			HH food insecurity: insufficient food quality			HH food insecurity: insufficient food intake			Food security access scale score		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Treatment dummy (= 1 if treatment Gram Panchayat)	0.006	0.013	0.007	−0.022	−0.015	−0.018	−0.025	−0.015	−0.016	−0.243	−0.198	−0.217
	(0.027)	(0.025)	(0.022)	(0.028)	(0.026)	(0.023)	(0.027)	(0.026)	(0.026)	(0.202)	(0.184)	(0.186)
P-value cluster	0.836	0.606	0.766	0.450	0.568	0.436	0.365	0.557	0.542	0.241	0.294	0.256
P-value bootstrap	0.864	0.607	0.761	0.491	0.595	0.464	0.391	0.574	0.551	0.274	0.327	0.266
Comparison arm mean	0.484	0.484	0.484	0.642	0.642	0.642	0.412	0.412	0.412	4.164	4.164	4.164
Observations	2,119	2,114	2,114	2,119	2,114	2,114	2,119	2,114	2,114	2,119	2,114	2,114

Source: Authors' calculations.

Notes:

1. *p < 0.10; **p < 0.05; ***p < 0.01
2. Standard errors in parentheses
3. Regression specification accounts for survey design (clustering at Gram Panchayat level), with block-level fixed effects. Both clustered and wild bootstrapped p-values have been estimated for each specification
4. The first column in each table reports the unadjusted base specification, i.e., the coefficient on the treatment indicator without controlling for any additional characteristics. Each subsequent column adds a set of covariates: column 2 adds those baseline covariates that were unbalanced at the 10 percent level, and column 3 controls for these baseline unbalanced characteristics as well as other relevant baseline characteristics
5. Baseline covariates unbalanced at 10 percent include: HH size, no. female HH members, HH head is General caste, HH has electricity, HH floor is made of improved material, respondent woman's husband is HH head, highest number of years of schooling in the HH (female) and dummy for respondent woman being an agricultural laborer. The full list of covariates includes: all those covariates unbalanced at 10 percent; in addition, the number of assets owned by the HH, caste of HH head, HH head is Muslim, 10 dummies for HH demographic structure, any female HH member has bank account, respondent woman age, dummies for respondent woman being a non-agricultural day laborer or a housewife.
6. All columns control for baseline values of the outcome variable
7. Baseline comparison arm mean values are provided for comparison

6. UTILIZATION OF GOVERNMENT SCHEMES, INTERVENTION, DELIVERY, AND EXPOSURE

In this chapter we explore household's utilization of government health, nutrition, and sanitation programs; exposure to the core JEEViKA platforms including participation in SHG activities; topics discussed in SHG meetings; and finally, exposure to other specific elements of the MC pilot. In doing so, we aim to explain the plausibility of the findings of impact on dietary diversity and on nutrition knowledge discussed in Chapters 4 and 5.

Chapter 6: Overview

Research question addressed Do the JEEViKA-MC interventions increase utilization of government health, nutrition, and sanitation programs as well as JEEViKA food security-related services?

Outcomes analysed

- Woman: exposure to core and pilot-specific JEEViKA platforms, trial, and adoption of recommended behaviors
- Household: awareness and utilization of government programs

Main findings

Woman:

- SHGs in the treatment arm were more likely to discuss all topics *except* savings, credit, and personal issues, where the SHGs in both arms were balanced.
- Treatment arm women were not more likely to be members of SHGs themselves, nor to have savings and credit activities, suggesting that the nutrition intervention did not displace basic program activities.
- More women in the treatment arm were aware of the Health Risk Fund and Food Security Fund. More women had used the Food Security Fund and received food from the Village organization, and household members were more likely to use the Food Security Fund to purchase food.
- Family members in the treatment households were more likely to ever have had a kitchen garden, to currently have a kitchen garden, and to have kitchen gardens that were cultivated year-round.
- Women in the treatment arm were more likely to be shown videos on health and nutrition, more likely to be visited by an health subcommittee member, or by a Community Nutrition Resource Person, Community Resource Person, or CM in the last six months; more likely to have JEEViKA community events were held in their panchayats; and more likely to receive health/nutrition services at these community events.
- Exposure to—and trial and adoption of—pilot-promoted health and nutrition messages was significantly higher among women in the treatment arm.

Household:

- The intervention had no impact on awareness of the JSY, the Janani Shishu Suraksha Karyakram (JSSK), and the Pradhan Mantri Matritva Suraksha Yojana (PMSMA) or the Public Distribution System (PDS).
- There was no impact on child enrollment in the Anganwadi Center; child attendance at the Anganwadi Center in the last 12 months or current attendance at the Anganwadi Center.
- There was also not impact on the receipt of Take-Home Ration (THR) for either the mother or the child.
- Households in the comparison groups were slightly more likely to use the Public Distribution System (PDS) than households in the treatment areas.

6.1. Exposure to Government Services

One of the aims of the pilot was to increase awareness and utilization of government services, which was to be achieved by simultaneously improving both the demand for these services (through Component 1) and their supply (through Component 2). To assess the impact of the pilot on this aspect, we asked respondents for their awareness and use of three government schemes targeted at mothers—the Janani Suraksha Yojana, the Janani Shishu Suraksha Karyakram, and the Pradhan Mantri Matritva Suraksha Yojana. We asked the households if they were aware of these schemes, if they knew of the benefits they were eligible for under the scheme in question, and if they had received any of their benefits. If the respondent provided information on any one of the scheme benefits, we scored them as a 1 on the knowledge variable.

We find no impact of the pilot on awareness of these three schemes (Table 6.1). While there is widespread awareness of Janani Suraksha Yojana—with 97 percent of the comparison arm mothers aware of the program—the Pradhan Mantri Matritva Suraksha Yojana is unfamiliar to most. This is not surprising, given that the Janani Suraksha Yojana has been in place since 2005 while the Pradhan Mantri Matritva Suraksha Yojana was launched only in 2016. We also find no impact of the pilot on knowledge of the benefits of these schemes. Finally, among those who were aware of the scheme, we asked about receipt of any benefits. We find no impact of the pilot on the likelihood of mothers receiving any benefits from these schemes.[12] Overall, the pilot does not appear to have significantly improved awareness and utilization, at least for these three schemes.

[12] Results on impact on knowledge of benefits and receipt of benefits under these government schemes are not reported but available upon request from the authors.

Table 6.1 Impact of JEEViKA-MC pilot on awareness of government schemes for mothers

	Mothers of youngest child: Awareness of government schemes								
	Janani Suraksha Yojana (JSY)			Janani Shishu Suraksha Karyakram (JSSK)			Pradhan Mantri Matritra Suraksha Yojana (PMSMA)		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Treatment dummy (= 1 if treatment Gram Panchayat)	0.003	−0.002	−0.003	0.055	0.043	0.038	0.041	0.034	0.037
	(0.010)	(0.010)	(0.010)	(0.040)	(0.045)	(0.044)	(0.028)	(0.028)	(0.029)
P-value cluster	0.800	0.863	0.743	0.187	0.343	0.400	0.150	0.233	0.210
P-value bootstrap	0.808	0.875	0.761	0.223	0.394	0.450	0.193	0.244	0.229
Comparison arm mean	0.974	0.974	0.974	0.573	0.573	0.573	0.128	0.128	0.128
Observations	805	804	804	805	804	804	805	804	804

Source: Authors' calculations.

Notes:

1. *p < 0.10; **p < 0.05; ***p < 0.01
2. Standard errors in parentheses
3. Regression specification accounts for survey design (clustering at Gram Panchayat level), with block-level fixed effects. Both clustered and wild bootstrapped p-values have been estimated for each specification
4. The first column in each table reports the unadjusted base specification, i.e., the coefficient on the treatment indicator without controlling for any additional characteristics. Each subsequent column adds a set of covariates: column 2 adds those baseline covariates that were unbalanced at the 10 percent level, and column 3 controls for these baseline unbalanced characteristics as well as other relevant baseline characteristics
5. Baseline covariates unbalanced at 10 percent include: HH size, no. female HH members, HH head is General caste, HH has electricity, HH floor is made of improved material, respondent woman's husband is HH head, highest number of years of schooling in the HH (female) and dummy for respondent woman being an agricultural laborer. The full list of covariates includes: all those covariates unbalanced at 10 percent; in addition, the number of assets owned by the HH, caste of HH head, HH head is Muslim, 10 dummies for HH demographic structure, any female HH member has bank account, respondent woman age, dummies for respondent woman being a non-agricultural day laborer or a housewife.
6. Endline comparison arm mean values are provided for comparison

Next, we looked at the use of the Public Distribution System (PDS) by households to examine whether enrollment in and use of the PDS were higher in the treatment arm as a result of the pilot interventions. Overall, the proportion of households who had heard of the PDS was almost 100%, the proportion with ration cards was more than 80% in both arms, and more than 85% had ever purchased anything from the ration shops (Table 6.2). Our impact estimates indicate that use of the PDS was a little higher ($p<0.05$) in the comparison group, but very similar to that in the treatment group (Table 6.3). The most purchased commodities were rice, wheat and kerosene in both groups, with no difference between the two groups (Figure 6.1).

The final set of services that are important for mothers and young children are those provided by the Anganwadi Center under the Integrated Child Development Scheme program. We asked respondent women about the use of these services for the index child (**Error! Reference source not found.**4). We find no impact of the JEEViKA-MC pilot on the likelihood of the child being enrolled in the Anganwadi Center; of the child attending the Anganwadi Center in the last 12 months or currently attending the Anganwadi Center; of the mother receiving Take Home Ration meant for feeding herself or the child. The average receipt of these services varies. While 84 percent of comparison arm mothers whose child was enrolled in the Anganwadi Center report that their child attended the Anganwadi Center in the last 12 months, only around 50 percent or less of mothers received Take Home Ration for themselves or their child.

Table 6.2: Household use of the Public Distribution System

	Treatment arm			Comparison arm			Overall			
	Mean/ Proportion	**Standard Deviation**	**N**	**Mean/ Proportion**	**Standard Deviation**	**N**	**Mean/ Proportion**	**Standard Deviation**	**N**	**P-value**
Ever heard about a ration shop	98.26	0.13	1,095	99.02	0.10	1,020	98.63	0.12	2,115	0.28
Household have a ration card	80.46	0.40	1,095	85.29	0.35	1,020	82.79	0.38	2,115	0.02**
Household ever purchased anything from ration shop	85.75	0.35	1,095	89.22	0.31	1,020	87.42	0.33	2,115	0.12

Source: Author's calculations

Legend: * p<0.10; ** p<0.05; *** p<0.01

Table 6.3: Impact of JEEViKA-MC pilot on household PDS indicators

	Household PDS indicators								
	Ever heard of PDS or ration shop			Household have a ration card			Household ever purchased anything from ration shop		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Treatment dummy (=1 if treatment GP)	-0.007	-0.007	-0.007	-0.040	-0.042	-0.042	-0.023	-0.025	-0.025
	(0.008)	(0.008)	(0.009)	(0.018)	(0.018)	(0.017)	(0.020)	(0.019)	(0.019)
P-value cluster	0.357	0.385	0.429	0.036**	0.030**	0.023**	0.243	0.203	0.204
P-value bootstrap	0.424	0.457	0.504	0.040**	0.038**	0.028**	0.270	0.221	0.214
Comparison arm mean	0.990	0.990	0.990	0.853	0.853	0.853	0.892	0.892	0.892
Observations	2,115	2,115	2,115	2,115	2,115	2,115	2,115	2,115	2,115

Source: Authors' calculations.

Notes:
1. *p < 0.10; **p < 0.05; ***p < 0.01
2. Standard errors in parentheses
3. Regression specification accounts for survey design (clustering at Gram Panchayat level), with block-level fixed effects. Both clustered and wild bootstrapped p-values have been estimated for each specification
4. The first column in each table reports the unadjusted base specification, i.e., the coefficient on the treatment indicator without controlling for any additional characteristics. Each subsequent column adds a set of covariates: column 2 adds those baseline covariates that were unbalanced at the 10 percent level, and column 3 controls for these baseline unbalanced characteristics as well as other relevant baseline characteristics
5. Baseline covariates unbalanced at 10 percent include: HH size, no. female HH members, HH head is General caste, HH has electricity, HH floor is made of improved material and highest number of years of schooling in the HH (female). The full list of covariates includes: all those covariates unbalanced at 10 percent; in addition, the number of assets owned by the HH, caste of HH head, HH head is Muslim, any female HH member has bank account and 10 dummies for HH demographic structure.
6. Endline comparison arm mean values are provided for comparison

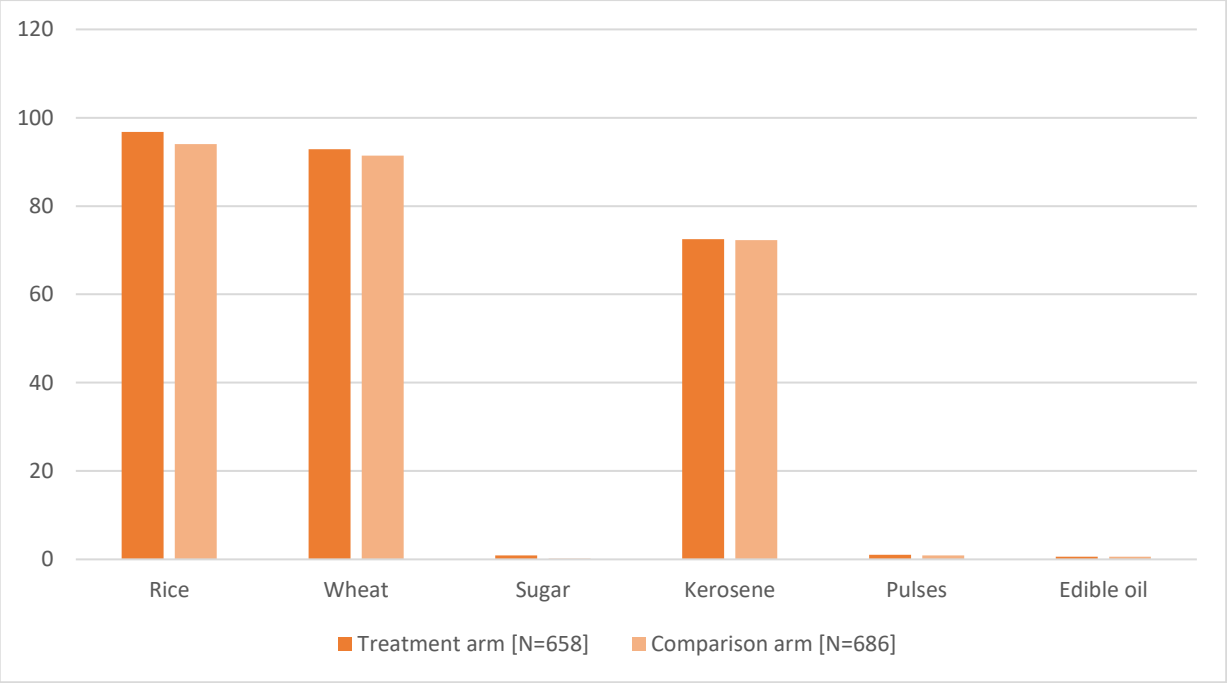

Figure 6-1: Types of items being purchased from the ration shop in last 30 days

Table 6.4: Impact of JEEViKA-MC pilot on utilization of Anganwadi Center services

	Index child: Utilization of Anganwadi Center services														
	Child enrolled at the Anganwadi Center			**Child visited the Anganwadi Center in the last 12 months**			**Child currently attends the Anganwadi Center**			**Received Take Home Ration meant for feeding the child**			**Received Take Home Ration for mother when pregnant with child**		
	(1)	**(2)**	**(3)**	**(1)**	**(2)**	**(3)**	**(1)**	**(2)**	**(3)**	**(1)**	**(2)**	**(3)**	**(1)**	**(2)**	**(3)**
Treatment dummy (= 1 if treatment Gram Panchayat)	0.010	0.009	0.007	0.005	0.001	−0.006	0.018	0.018	0.012	0.010	0.006	0.003	0.043	0.043	0.038
	(0.048)	(0.050)	(0.051)	(0.034)	(0.034)	(0.034)	(0.044)	(0.045)	(0.045)	(0.040)	(0.041)	(0.041)	(0.041)	(0.043)	(0.042)
P-value cluster	0.837	0.858	0.895	0.885	0.969	0.869	0.690	0.690	0.787	0.805	0.888	0.939	0.308	0.332	0.378
P-value bootstrap	0.874	0.891	0.914	0.894	0.976	0.890	0.702	0.699	0.808	0.810	0.897	0.953	0.358	0.389	0.435
Comparison arm mean	0.485	0.485	0.485	0.835	0.835	0.835	0.379	0.379	0.379	0.306	0.306	0.306	0.410	0.410	0.410
Observations	1,828	1,825	1,825	908	907	907	1,829	1,826	1,826	1,785	1,782	1,782	1,785	1,782	1,782

Source: Authors' calculations.

Notes:

1. *p < 0.10; **p < 0.05; ***p < 0.01
2. Standard errors in parentheses
3. Regression specification accounts for survey design (clustering at Gram Panchayat level), with block-level fixed effects. Both clustered and wild bootstrapped p-values have been estimated for each specification
4. The first column in each table reports the unadjusted base specification, i.e., the coefficient on the treatment indicator without controlling for any additional characteristics. Each subsequent column adds a set of covariates: column 2 adds those baseline covariates that were unbalanced at the 10 percent level, and column 3 controls for these baseline unbalanced characteristics as well as other relevant baseline characteristics
5. Baseline covariates unbalanced at 10 percent include: HH size, no. female HH members, HH head is General caste, HH has electricity, HH floor is made of improved material, respondent woman's husband is HH head, highest number of years of schooling in the HH (female) and dummy for respondent woman being an agricultural laborer. The full list of covariates includes: all those covariates unbalanced at 10 percent; in addition, the number of assets owned by the HH, caste of HH head, HH head is Muslim, 10 dummies for HH demographic structure, any female HH member has bank account, respondent woman age, dummies for respondent woman being a non-agricultural day laborer or a housewife.
6. All columns (except for outcome, Received Take Home Ration for mother when pregnant with child) additionally control for endline values of child's age and gender dummy
7. Endline comparison arm mean values are provided for comparison

6.2. Exposure to the Core JEEViKA Platforms

6.2.1. Self-help groups (SHGs)

Part of the focus of the MC pilot was on strengthening awareness and use of the core platforms that are provided by JEEViKA in all areas, especially the use of funds intended for health and food security-related purposes. We asked respondents about services and platforms that were available in both treatment and comparison areas as part of the standard JEEViKA model, as well as about services that were provided or strengthened only in the treatment panchayats.

Around 73 percent of women were part of an SHG at endline (**Error! Reference source not found.**5). This percentage has not changed from baseline and is almost the same in both arms. On average, these women have been SHG members for a little over four years; again, this did not differ significantly across the two arms. Most SHGs have savings and credit activities and most women participate in these activities. This did not differ across treatment and comparison areas. Women in the treatment areas are significantly less likely than the women in the comparison areas to have never attended an SHG meeting. Non-SHG members say that another household member being active (36 percent) and lack of interest (23 percent) are the main reasons for not being a member (Figure 6-2).

At endline, more than half the women in our sample had ever taken a loan from the SHG, with an average loan amount of a slightly more than 10,000 Indian rupees (INR)[13] (**Error! Reference source not found.**6). In the treatment arm, about 37 percent of those that took out a loan reported using it for medical expenses and 14 percent reported using it for consumption needs. The proportion reporting taking a loan for their family's consumption needs is significantly higher in the comparison arm.

We asked the women who were SHG members at endline about topics discussed in the SHG meetings (**Error! Reference source not found.**-3). Close to 68 percent of all women reported discussing savings and credits issues, followed by about 49 percent who reported discussing issues related to water, sanitation and hygiene (WASH). Significant differences across arms were observed in all topics discussed in SHG meetings *except* savings and credit and personal issues, where the SHGs were balanced, as would be expected. The treatment arm SHGs consistently discussed the remaining issues with greater frequency. Use of the Food Security Fund to achieve food security, kitchen garden cultivation, the importance of food and dietary diversity, and use of the Health Risk Fund for healthcare were among the other topics discussed during these meetings.

[13] At the time of writing, 1 USD was approximately equal to INR 70.

Table 6.5: SHG membership and activities at endline, by treatment arm

SHG membership and activities	Treatment arm			Comparison arm			
	Mean/ Proportion	Standard deviation	N	Mean/ Proportion	Standard deviation	N	P-value
Currently member of an SHG	73.18	0.44	1,096	73.31	0.44	1,023	0.96
Length of time respondent has been part of the SHG	4.21	2.27	802	4.08	2.16	750	0.47
Attends SHG meetings at least once a month	86.16	0.35	802	83.07	0.38	750	0.26
Never attended an SHG Meeting	5.49	0.23	802	8.67	0.28	750	0.03**
SHG has savings and credit activities	90.50	0.29	800	89.56	0.31	747	0.66
Participates in savings and credit activities	93.51	0.25	724	92.83	0.26	669	0.77

Source: Authors' calculations.
Legend: *p < 0.10; **p < 0.05; ***p < 0.01

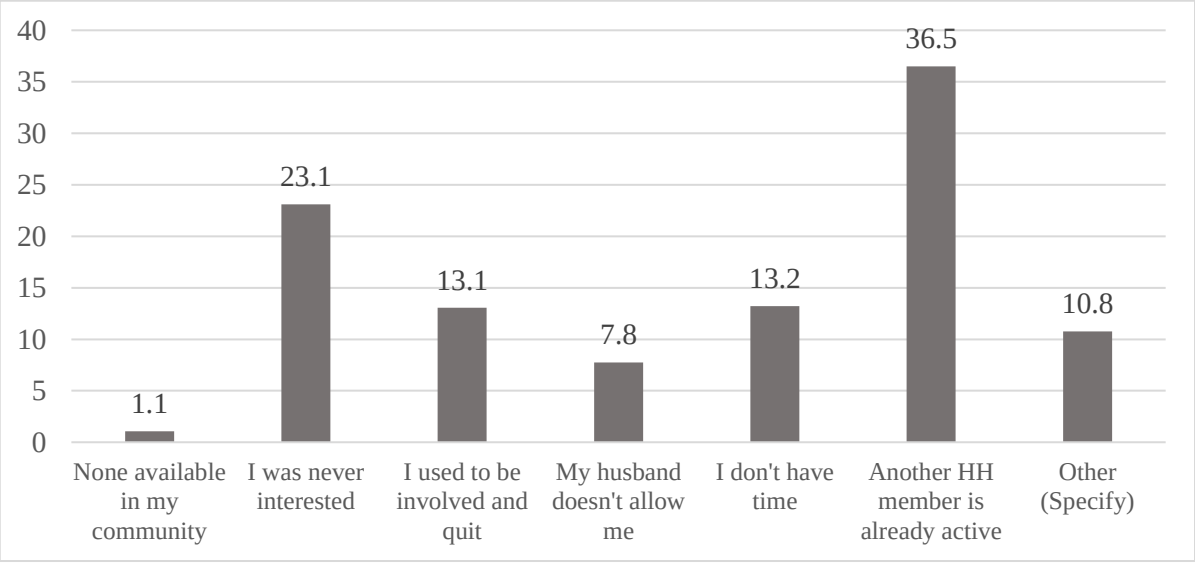

Figure 6-2: Reasons for not being an SHG memberat endline, by treatment arm

Table 6.6: Loans and financial assistance from SHG at endline, by treatment arm

	Treatment arm			Comparison arm			
Loans and financial assistance from SHG	**Mean/ Proportion**	**Standard deviation**	**N**	**Mean/ Proportion**	**Standard deviation**	**N**	**P-value**
Ever taken loan from SHG	64.36	0.48	1,083	63.49	0.48	1,008	0.81
Amount of last loan	10,431.73	20,786.83	687	10,324.53	13,592.32	632	0.92
Used last loan for							
Own or family's consumption needs	14.06	0.35	697	20.00	0.40	640	0.06*
Expenses related to ceremonies/festivals	1.72	0.13	697	1.72	0.13	640	1.00
Repaying another loan	2.87	0.17	697	3.28	0.18	640	0.66
Purchase of any machinery/equipment for non-agricultural purposes	3.73	0.19	697	2.81	0.17	640	0.35
Lent money to friends/family	2.30	0.15	697	2.66	0.16	640	0.73
Building a toilet	5.45	0.23	697	3.44	0.18	640	0.35
Daughter's wedding	4.59	0.21	697	4.53	0.21	640	0.96
Consumer durable	1.29	0.11	697	1.56	0.12	640	0.65
Home construction/maintenance	11.19	0.32	697	12.50	0.33	640	0.54
Education	0.86	0.09	697	0.47	0.07	640	0.36
Medical expenses	37.16	0.48	697	37.03	0.48	640	0.97
Investment in agricultural equipment	3.30	0.18	697	3.44	0.18	640	0.92
Inputs into agricultural production (e.g., seeds)	10.62	0.31	697	6.56	0.25	640	0.06*
Livestock	5.16	0.22	697	3.44	0.18	640	0.20
Others	4.16	0.20	697	4.22	0.20	640	0.95
Do not know	0.86	0.09	697	0.63	0.08	640	0.65

Source: Authors' calculations.
Legend: *p < 0.10; **p < 0.05; ***p < 0.01

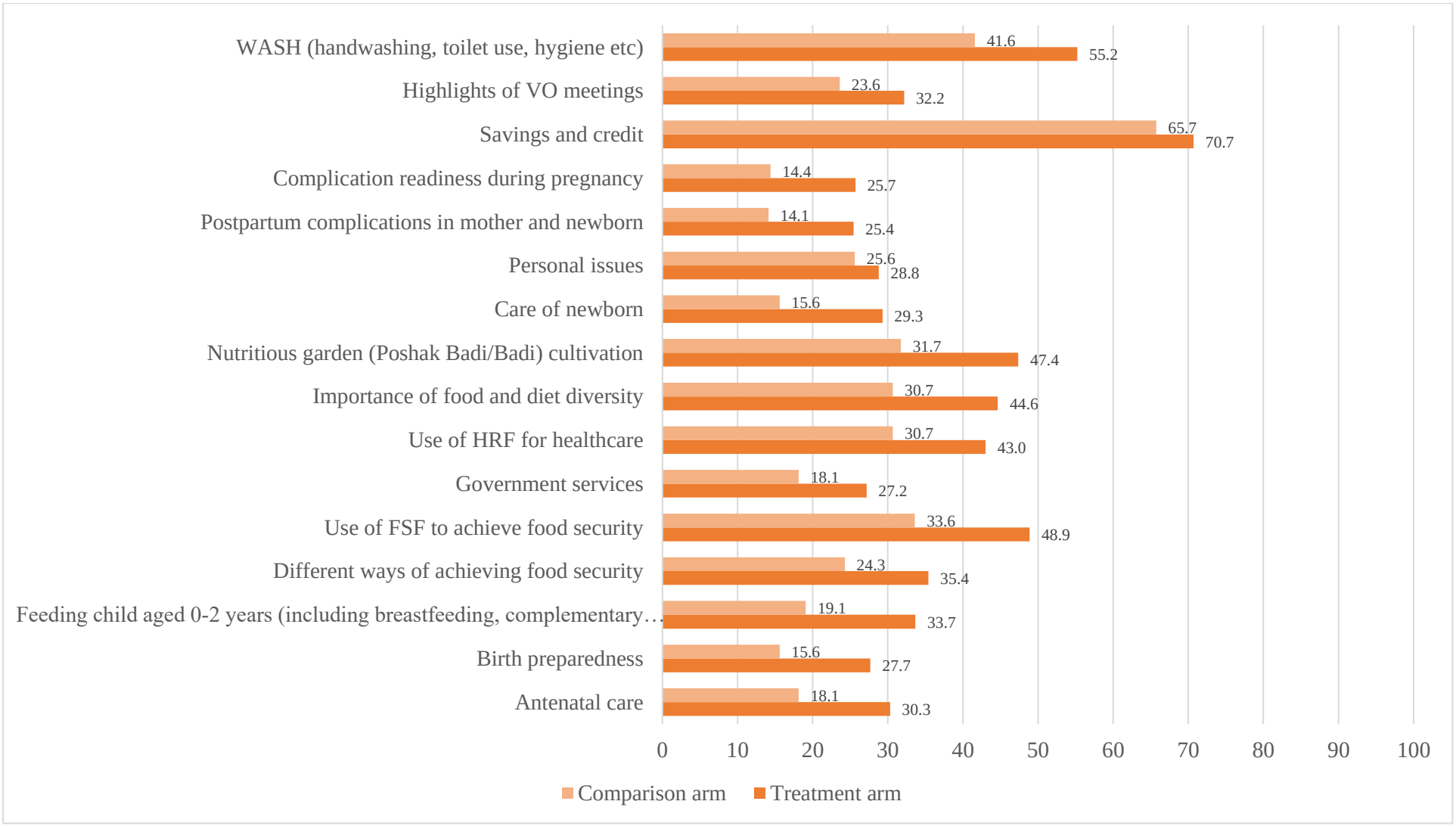

Figure 6-3: Topics discussed in SHG meetings in last 12 months at endline, by treatment arm

Finally, we estimate the impact of the pilot on being an SHG member and do not find that treatment arm women were more likely to be members of SHGs themselves, or that the SHGs were any more (or less) likely to have savings and credit activities.[14] This non-result is reassuring, because it shows that the program did not differentially target resources to the treatment areas to the detriment of groups in the comparison areas.

6.2.2. Health Risk Fund

A significantly higher proportion of women in the treatment arm were aware of the Health Risk Fund (55.02 versus 46.14, $p < 0.05$; Table 6.5). Nevertheless, the use of Health Risk Fund was low: only 19.2 percent and 25.3 percent of women in the treatment and comparison arms, respectively, used the fund for health emergencies. This difference is significant ($p < 0.10$). "Lack of health emergency" was the primary reason reported for not using the Health Risk Fund (Table 6.7**Error! Reference source not found.**). Of the women who *did* request loans, 12.7 percent in treatment and 10.1 percent in the comparison arm had their request denied, which is not statistically different across the two arms. In the treatment arm, the primary reason for denial of request was lack of sufficient money in the Health Risk Fund; whereas, in the comparison arm, the primary reason was that a loan was given to someone in greater need (**Error! Reference source not found.**-5).

[14] Results not reported but available upon request from the authors.

Table 6.7: Knowledge and use of the Health Risk Fund at endline, by treatment arm

	Treatment arm			Comparison arm			
Health emergencies and financial assistance	**Mean/ Proportion**	**Standard deviation**	**N**	**Mean/ Proportion**	**Standard deviation**	**N**	**P-value**
Aware of the Village organization's Health Risk Fund	55.02	0.50	1,096	46.14	0.50	1,023	0.01**
Taken a loan from the Village organization's Health Risk Fund	19.32	0.40	590	25.22	0.43	464	0.10*
Requested Health Risk Fund loan for health emergency denied	12.71	0.33	409	10.14	0.30	345	0.35
Any other SHG member taken a loan from Village organization's Health Risk Fund	40.74	0.49	540	41.53	0.49	419	0.87

Source: Authors' calculations.
Legend: *p < 0.10; **p < 0.05; ***p < 0.01

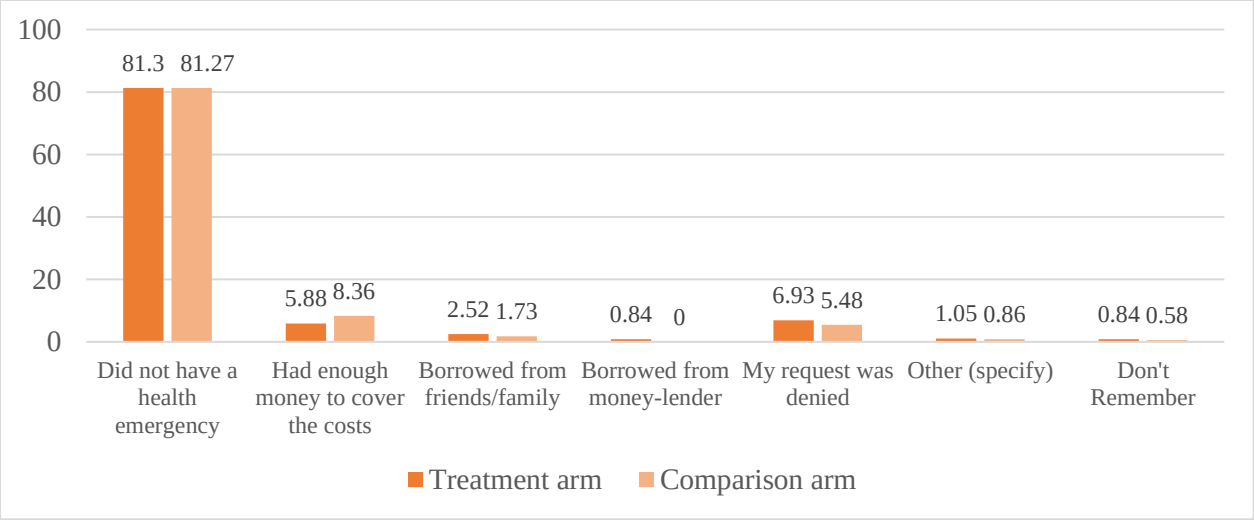

Figure 6-4: Reasons for not taking a loan from the Health Risk Fund at endline, by treatment arm

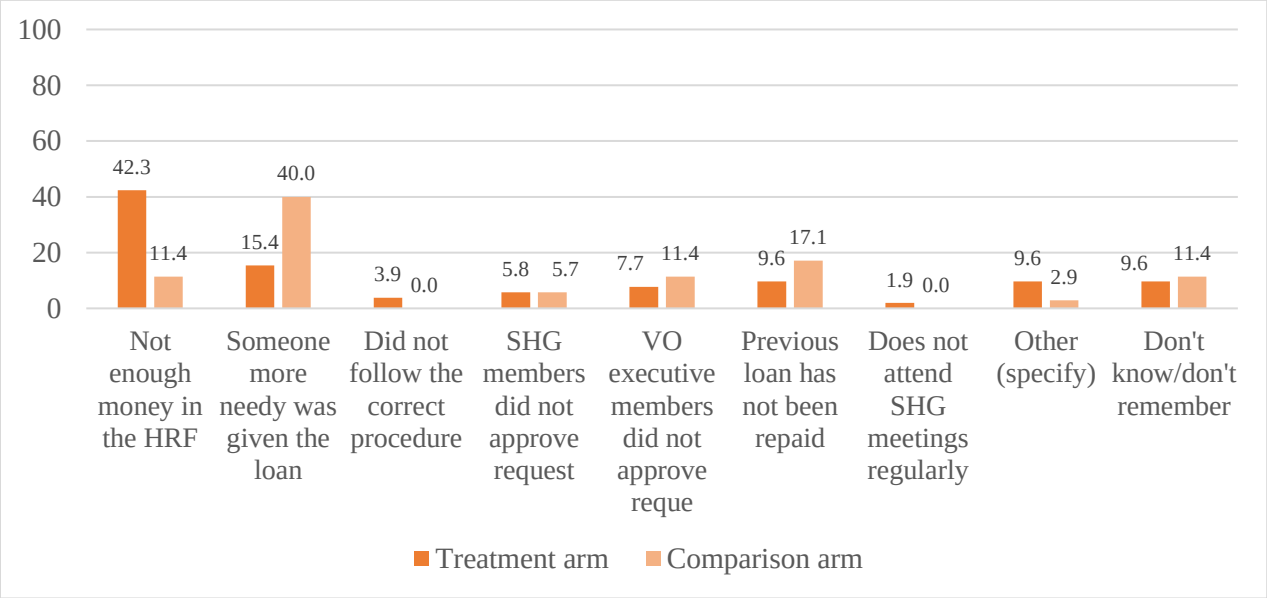

Figure 6-5: Reasons for denial of loan requested from Health Risk Fund at endline, by treatment arm

6.2.3. Food Security Fund

Approximately 73 percent of treatment arm respondents reported being aware of the Food Security Fund (**Error! Reference source not found.**8). Of these, 72 percent had used this fund and received food from the Village organization. In both cases the treatment arm numbers are significantly higher than in the comparison arm ($p < 0.01$). In addition, a higher percentage of women in the treatment arm reported other SHG members receiving food from the VO's Food Security Fund ($p < 0.05$). Across both arms, lack of need followed by denial of request were the main reasons for not receiving food from the Food Security Fund. On average, about 12-13 percent of the respondents had their request for food denied. Nearly one-half of respondent women did not know the reason for denial of request for food items from Food Security Fund. In the treatment arm, lack of money in Food Security Fund and not enough SHG members placing the request were the top two known reasons for denial of request for food items. In the comparison arm, lack of money in Food Security Fund, followed by non-approval of request by VO executive members, were the primary known reasons for denial of request.

Table 6.8: Knowledge and use of the Food Security Fund at endline, by treatment arm

	Treatment arm			Comparison arm			
Awareness and use of the food security fund	**Mean/ Proportion**	**Standard deviation**	**N**	**Mean/ Proportion**	**Standard deviation**	**N**	**P-value**
Has heard of Food Security Fund	72.81	0.45	1,096	58.55	0.49	1,023	0.00***
Has received food from the VO	72.47	0.45	792	63.70	0.48	595	0.00***
Reasons for not receiving food from the VO:							
Did not need any food items	59.17	0.49	218	50.46	0.50	216	0.14
Had enough money to cover the costs	4.59	0.21	218	8.80	0.28	216	0.09*
Borrowed from friends/family	1.38	0.12	218	1.39	0.12	216	0.99
Borrowed from money lender	0.92	0.10	218	0.46	0.07	216	0.56
My request was denied	12.39	0.33	218	13.43	0.34	216	0.74
Bought food from the open market instead	3.21	0.18	218	6.48	0.25	216	0.28
Do not know about the Food Security Fund	2.29	0.15	218	4.17	0.20	216	0.12
Price of food items purchased through Food Security Fund was higher than open market price	1.83	0.13	218	3.70	0.19	216	0.44
Other	2.29	0.15	218	2.78	0.16	216	0.77
Do not know/remember	8.26	0.28	218	5.56	0.23	216	0.17
Request with VO for purchase of food items denied	6.82	0.25	645	10.70	0.31	486	0.02**
Reasons for denial							
Not enough money in the Food Security Fund	22.73	0.42	44	19.23	0.40	52	0.71
Not enough SHG members placed a request	13.64	0.35	44	11.54	0.32	52	0.75
Did not follow the correct procedure	4.55	0.21	44	1.92	0.14	52	0.46
Previous loan from the Food Security Fund had not been repaid	11.36	0.32	44	3.85	0.19	52	0.20
VO executive members did not approve request	0.00	0.00	44	15.38	0.36	52	0.00***
Other	9.09	0.29	44	5.77	0.24	52	0.56
Do not know/remember	47.73	0.51	44	46.15	0.50	52	0.86
Any other SHG member received food items from Food Security Fund	78.46	0.41	766	70.52	0.46	563	0.03**

Source: Authors' calculations.
Legend: *p < 0.10; **p < 0.05; ***p < 0.01

In concluding this section on core JEEViKA platforms, we present the impact estimates for the core JEEViKA fund-related interventions (**Error! Reference source not found.**9). To corroborate our descriptive results already presented, we find encouraging results here as well. There is no impact on the likelihood of women taking loans from their SHG (columns 1–3 of the first outcome). We find a 7pp *reduction* in the likelihood of their taking a loan from the Health Risk Fund fund (column 3 of the second outcome) in the fully specified model, though this result is not statistically significant when bootstrapped standard errors are employed. This result could indicate improved health and/or earning capacity as a result of the intervention and, hence, a lower dependence on this fund. Finally, we also find an 11pp increase in the likelihood of someone in the household using the Food Security Fund to purchase food (column 3 of the third outcome). This amounts to a 17.7 percent increase over the mean in the comparison arm. Since the Food Security Fund was specifically encouraged in the treatment arm to improve household access to food, this is a very encouraging result.

Table 6.9: Impact of JEEViKA-MC pilot on utilization of funds provided through the JEEViKA platforms

Utilization of funds provided through JEEViKA platforms									
	Ever received a loan from the SHG			Anyone in family took a loan from the Health Risk Fund			Any family member received food from the Food Security Fund		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Treatment dummy (= 1 if treatment Gram Panchayat)	0.027	0.029	0.035	−0.057	−0.056	−0.065	0.109	0.108	0.112
	(0.032)	(0.034)	(0.034)	(0.036)	(0.036)	(0.036)	(0.023)	(0.025)	(0.026)
P-value cluster	0.415	0.401	0.313	0.128	0.126	0.089*	0.000***	0.000***	0.000***
P-value bootstrap	0.457	0.458	0.376	0.182	0.184	0.137	0.002***	0.001***	0.002***
Comparison arm mean	0.635	0.635	0.635	0.252	0.252	0.252	0.637	0.637	0.637
Observations	2,091	2,086	2,086	1,054	1,050	1,050	1,387	1,383	1,383

Source: Authors' calculations.

Notes:

1. *p < 0.10; **p < 0.05; ***p < 0.01
2. Standard errors in parentheses
3. Regression specification accounts for survey design (clustering at Gram Panchayat level), with block-level fixed effects. Both clustered and wild bootstrapped p-values have been estimated for each specification
4. The first column in each table reports the unadjusted base specification, i.e., the coefficient on the treatment indicator without controlling for any additional characteristics. Each subsequent column adds a set of covariates: column 2 adds those baseline covariates that were unbalanced at the 10 percent level, and column 3 controls for these baseline unbalanced characteristics as well as other relevant baseline characteristics
5. Baseline covariates unbalanced at 10 percent include: HH size, no. female HH members, HH head is General caste, HH has electricity, HH floor is made of improved material, respondent woman's husband is HH head, highest number of years of schooling in the HH (female) and dummy for respondent woman being an agricultural laborer. The full list of covariates includes: all those covariates unbalanced at 10 percent; in addition, the number of assets owned by the HH, caste of HH head, HH head is Muslim, 10 dummies for HH demographic structure, any female HH member has bank account, respondent woman age, dummies for respondent woman being a non-agricultural day laborer or a housewife.
6. Endline comparison arm mean values are provided for comparison

6.2.4. Kitchen gardens

Kitchen gardens are common in these areas, but the model being encouraged under the MC pilot was one in which the garden was cultivated year-round, to aid in household food security and increase the quantity of fruits and vegetables consumed. Close to two-thirds of the respondent women in the treatment arm reported ever having a kitchen garden, which is significantly higher than the proportion in the comparison arm (Table 6.10, $p < 0.01$). However, surprisingly, the average length for which these gardens have been cultivated is longer in the comparison arm (42.1 months versus 35.5 months, $p < 0.1$).

The primary reason for not having a kitchen garden was lack of space or land, followed by lack of time and lack of water. Around 36 percent of the respondent women reported not having received any information about these gardens in the treatment arm, as compared to 50% of comparison arm women. The CM is the main source of advice in the treatment arm, and family and friends in the comparison arm. A statistically higher proportion of respondents in the treatment arm ever received advice on what crops to grow (70.3 vs 54.5, $p < 0.01$), how to plant the seeds (63.9 vs 50.7, $p < 0.01$), how to tend to the plants (60.6 vs 46.1, $p < 0.05$), and what inputs to add (57.5 vs 43.9, $p < 0.01$). Across both the arms, only a small percent of respondents received inputs for a kitchen garden with a majority of those receiving seeds. This result is not statistically different across the two arms.

Table 6.10: Awareness of and engagement in home cultivation at endline, by treatment arm

	Treatment arm			Comparison arm			
Awareness and engagement in home cultivation	**Mean/ Proportion**	**Standard deviation**	**N**	**Mean/ Proportion**	**Standard deviation**	**N**	**P-value**
Percent ever had kitchen garden (poshak badi)	61.68	0.49	1,096	48.48	0.50	1,023	0.00***
Percent currently have a kitchen garden	75.48	0.43	726	66.73	0.47	553	0.05**
Average length of time the nutrition garden was cultivated (in months)	35.50	35.14	548	43.27	42.15	369	0.07*
Source of advice about kitchen gardens							
SHG members	18.79	0.39	676	13.51	0.34	496	0.09*
Family/friends	27.81	0.45	676	26.01	0.44	496	0.62
CM	31.66	0.47	676	13.71	0.34	496	0.00***
Village Resource Person	8.14	0.27	676	5.44	0.23	496	0.22
Lilvelihood Specialist	0.89	0.09	676	0.81	0.09	496	0.85
Kisaan Salaahkar	0.74	0.09	676	0.60	0.08	496	0.76
Other (specify)	2.22	0.15	676	1.41	0.12	496	0.38
Do not know/do not remember	4.88	0.22	676	5.04	0.22	496	0.92
Never received this information	35.95	0.48	676	43.95	0.50	496	0.07*
Ever received advice on/about							
What crops to grow	70.26	0.46	548	54.47	0.50	369	0.00***
How to plant the seeds	63.87	0.48	548	50.68	0.50	369	0.01***
How to tend to the plants	60.58	0.49	548	46.07	0.50	369	0.01**
What inputs to add	57.48	0.49	548	43.90	0.50	369	0.01***
Received inputs for the kitchen garden	15.69	0.36	548	9.76	0.30	369	0.18
Inputs received							
Seeds	95.35	0.21	86	97.22	0.17	36	0.59
Fertilizer	2.33	0.15	86	11.11	0.32	36	0.25
Watering can							
Gardening tools	3.49	0.18	86	0.00	0.00	36	0.06*

Others	1.16	0.11	86	0.00	0.00	36	0.35
Do not know/do not remember	1.16	0.11	86	0.00	0.00	36	0.34
Reasons for not having a kitchen garden							
Not enough money to buy inputs	11.72	0.32	128	9.45	0.29	127	0.57
No space/land on which to grow plants	34.38	0.48	128	51.97	0.50	127	0.01**
Too time consuming	19.53	0.40	128	18.11	0.39	127	0.83
Lack of knowledge on how to grow plants	0.78	0.09	128				0.32
Resistance from family members	0.78	0.09	128	5.51	0.23	127	0.01**
It is the wrong time of year to grow fruits	17.97	0.39	128	16.54	0.37	127	0.78
Not enough water available	18.75	0.39	128	7.09	0.26	127	0.00***
Soil available is of poor quality/ soil is not appropriate to the plant	7.03	0.26	128	1.57	0.12	127	0.03**
Others	8.59	0.28	128	4.72	0.21	127	0.30
Do not know/do not remember	0.00	0.00	128	1.57	0.12	127	0.14

Source: Authors' calculations.
Legend: *p < 0.10; **p < 0.05; ***p < 0.01

Finally, we present the impact estimates on the kitchen garden use (Table 6.11) and find encouraging results. We observe a 13 pp increase in the likelihood that anyone in the household had ever had a kitchen garden (column 3 of first outcome), a sizeable 26 percent increase ($p < 0.01$) over the comparison arm mean; and a 8.2 pp increase (p (bootstrap) < 0.01) in the likelihood that the household currently has a kitchen garden (column 3 of second outcome), a 12 percent increase over the comparison arm mean levels. Finally, we also observe a 7.8 pp increase (p (bootstrap) < 0.1) in the likelihood that the household's current kitchen garden is cultivated year-round (column 3 of third outcome), which gives a sizeable 19 percent increase over the endline comparison mean levels. This result is reassuring, as year-round cultivated gardens are being encouraged under the MC pilot.

Table 6.11: Impact of JEEViKA-MC pilot on kitchen garden awareness and utilization

	Use of kitchen gardens								
	Anyone in family ever had a kitchen garden			Family currently has a kitchen garden			Cultivate the kitchen garden year-round		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Treatment dummy (= 1 if treatment Gram Panchayat)	0.129	0.121	0.127	0.073	0.071	0.082	0.074	0.069	0.078
	(0.039)	(0.040)	(0.041)	(0.038)	(0.039)	(0.036)	(0.036)	(0.036)	(0.036)
P-value cluster	0.003***	0.006***	0.005***	0.070*	0.079*	0.030**	0.054*	0.072*	0.041**
P-value bootstrap	0.007***	0.011**	0.009***	0.090*	0.101	0.054*	0.071*	0.100	0.052*
Comparison arm mean	0.485	0.485	0.485	0.667	0.667	0.667	0.401	0.401	0.401
Observations	2,119	2,114	2,114	1,279	1,274	1,274	1,279	1,274	1,274

Source: Authors' calculations.

Notes:

1. *p < 0.10; **p < 0.05; ***p < 0.01
2. Standard errors in parentheses
3. Regression specification accounts for survey design (clustering at Gram Panchayat level), with block-level fixed effects. Both clustered and wild bootstrapped p-values have been estimated for each specification
4. The first column in each table reports the unadjusted base specification, i.e., the coefficient on the treatment indicator without controlling for any additional characteristics. Each subsequent column adds a set of covariates: column 2 adds those baseline covariates that were unbalanced at the 10 percent level, and column 3 controls for these baseline unbalanced characteristics as well as other relevant baseline characteristics
5. Baseline covariates unbalanced at 10 percent include: HH size, no. female HH members, HH head is General caste, HH has electricity, HH floor is made of improved material, respondent woman's husband is HH head, highest number of years of schooling in the HH (female) and dummy for respondent woman being an agricultural laborer. The full list of covariates includes: all those covariates unbalanced at 10 percent; in addition, the number of assets owned by the HH, caste of HH head, HH head is Muslim, 10 dummies for HH demographic structure, any female HH member has bank account, respondent woman age, dummies for respondent woman being a non-agricultural day laborer or a housewife.
6. Endline comparison arm mean values are provided for comparison

6.3. Exposure to other JEEViKA-MC intervention activities

As part of the JEEViKA-MC pilot, certain pilot-specific activities were introduced in the treatment Gram Panchayats. Video messages on health and nutrition topics were developed by Digital Green for dissemination in the treatment Gram Panchayats. The CM was tasked with screening these videos and ensuring all SHGs had seen them. **Error! Reference source not found.**2 shows that exposure to these video messages is much higher among the households in the treatment areas compared to those in comparison areas. These videos were screened primarily at the CM's home.

Home visits by the Health Sub-committee, CM, or newer cadres of Community Resource Person and Community Nutrition Resource Persons (CNRPs) were planned under the pilot. The visits consisted of providing advice on child healthcare, dietary, and feeding practices, and demonstrations of feeding practices and recipes. The prevalence of home visits was almost twice as high in the treatment arm as compared to the comparison arm (**Error! Reference source not found.**3).

Several community-level events were also organized, including nukkad nataks and camps for child checkups. About 12 percent of the respondent women in the treatment arm reported that a community event was organized by JEEViKA in the last 6 months. This percentage is lower in the comparison arm at 7 percent (

4).

Table 6.12: Delivery of video messages at endline, by treatment arm

	Treatment arm			Comparison arm			
Delivery of video messages	**Mean/ Proportion**	**Standard deviation**	**N**	**Mean/ Proportion**	**Standard deviation**	**N**	**P-value**
Shown any videos on health and nutrition	26.73	0.44	1,096	5.96	0.24	1,023	0.00***
Health and nutrition videos were shown by							
CM	85.67	0.35	293	62.30	0.49	61	0.00***
Village Resource Person	15.70	0.36	293	19.67	0.40	61	0.58
Others	3.75	0.19	293	18.03	0.39	61	0.00***
Number of health and nutrition videos seen in last 1 year	2.24	1.56	288	1.90	1.30	60	0.30
Recognize all stills from video messages	3.56	0.19	1,096	0.59	0.08	1,023	0.00***
Total number of times all videos was seen	3.01	3.90	477	1.45	2.21	181	0.00***
Last screening of any videos was at							
CM's house	85.74	0.35	477	65.75	0.48	181	0.00***
SHG member's house	71.49	0.45	477	58.56	0.49	181	0.03**
Own house	37.74	0.49	477	23.20	0.42	181	0.01**
Neighbor's house	30.40	0.46	477	22.10	0.42	181	0.11
Community area	59.33	0.49	477	51.38	0.50	181	0.15
Others	13.84	0.35	477	25.41	0.44	181	0.01***
Do not know	5.66	0.23	477	8.84	0.28	181	0.27
Who was present at the last screening of any video							
SHG members	84.07	0.37	477	65.19	0.48	181	0.00***
Neighbors	59.75	0.49	477	43.09	0.50	181	0.02**
Husbands or fathers of SHG member	20.75	0.41	477	13.81	0.35	181	0.12
Mother / mother in-law of SHG member	23.90	0.43	477	17.68	0.38	181	0.26
Children	46.75	0.50	477	38.67	0.49	181	0.16
JEEViKA staff	45.28	0.50	477	38.67	0.49	181	0.38
Anganwadi worker	21.38	0.41	477	28.73	0.45	181	0.23
Others	1.89	0.14	477	6.63	0.25	181	0.01***
Do not remember	4.61	0.21	477	8.29	0.28	181	0.19

Source: Authors' calculations.
Legend: *p < 0.10; **p < 0.05; ***p < 0.01

Table 6.13: Home visits at endline, by treatment arm

	Treatment arm			Comparison arm			
Home visits	**Mean/ Proportion**	**Standard deviation**	**N**	**Mean/ Proportion**	**Standard deviation**	**N**	**P-value**
Visited by Health Subcommittee/Community Resource Person/Community Nutrition Resource Person/CM in last 6 months	30.39	0.46	1,089	17.75	0.38	1,014	0.00***
During home visit, received advice on							
Consumption of IFA	4.83	0.21	331	2.78	0.16	180	0.34
Diet diversity	38.37	0.49	331	22.78	0.42	180	0.01***
Breastfeeding practices	7.85	0.27	331	6.67	0.25	180	0.68
Weight check and blood test for pregnant women	12.99	0.34	331	7.78	0.27	180	0.09*
Preparations for delivery	6.34	0.24	331	3.89	0.19	180	0.32
Complementary feeding of child after 6 months	22.96	0.42	331	10.00	0.30	180	0.00***
Diet diversity for child after 6 months	15.71	0.36	331	7.22	0.26	180	0.02**
Taking care of child when sick	12.69	0.33	331	4.44	0.21	180	0.00***
Immunization of infant	7.85	0.27	331	3.89	0.19	180	0.11
Cooking demonstration	16.01	0.37	331	8.89	0.29	180	0.13
Cleanliness and hygiene	58.61	0.49	331	46.11	0.50	180	0.12
Other	13.60	0.34	331	23.33	0.42	180	0.05**
No message or advice given	10.57	0.31	331	22.22	0.42	180	0.01***
Do not know	2.11	0.14	331	2.22	0.15	180	0.95
Received Monitoring Tool during home visit	20.80	0.41	327	8.00	0.27	175	0.00***
Health Subcommittee/ Community Resource Person/Community Nutrition Resource Person demonstrated behaviors of feeding and sanitation practices	48.64	0.50	331	26.67	0.44	180	0.00***

Source: Authors' calculations.
Legend: *p < 0.10; **p < 0.05; ***p < 0.01

Table 6.14: Community events at endline, by treatment arm

	Treatment arm			Comparison arm			
Community events	**Mean/ Proportion**	**Standard deviation**	**N**	**Mean/ Proportion**	**Standard deviation**	**N**	**P-value**
Community events organized by JEEViKA: nukkad natak, bachhe ki jaanch mela	12.19	0.33	1,017	6.69	0.25	956	0.02**
Frequency of community events							
Once a month	25.81	0.44	124	10.94	0.31	64	0.07*
Once a week	1.61	0.13	124	0.00	0.00	64	0.10
Once in 2–3 months	5.65	0.23	124	4.69	0.21	64	0.76
Once in 6 months	17.74	0.38	124	10.94	0.31	64	0.28
Once a year	39.52	0.49	124	59.38	0.50	64	0.05*
Other	0.00	0.00	124	1.56	0.13	64	0.27
Do not know	9.68	0.30	124	12.50	0.33	64	0.63
Community events happen at least once a month	3.34	0.18	1,017	0.73	0.09	956	0.03**
Received health/nutrition services at community events	6.03	0.24	1,011	2.73	0.16	952	0.03**
Services received community events							
Counselling and demonstration of hand wash practices	93.44	0.25	61	92.31	0.27	26	0.88
Counselling and demonstration of initiation of semi-solid and solid foods in young	57.38	0.50	61	46.15	0.51	26	0.43
Counselling and demonstration of meal frequency, quality and quantity for children	37.70	0.49	61	34.62	0.49	26	0.81
Counselling and demonstration of diet diversity	55.74	0.50	61	53.85	0.51	26	0.83
Others	1.64	0.13	61	0.00	0.00	26	0.29
Do not know	1.64	0.13	61	0.00	0.00	26	0.29

Source: Authors' calculations.
Legend: *p < 0.10; **p < 0.05; ***p < 0.01

Finally, we present impact estimates for all of these pilot-specific activities (**Error! Reference source not found.**5). We find a 23 pp increase in the likelihood that women in the treatment arm were shown videos on health and nutrition in the preceding one year (column 3 of first outcome), a 15 pp increase in the likelihood that they were visited by an Health Sub-committee member, or by a Community Nutrition Resource Person, Community Resource Person, or CM in the last six months (column 3 of second outcome), a 6 pp increase in the likelihood that JEEViKA community events—such as nukkad natak and bacchon ki jaanch mela—were held in their panchayats, and a 4 pp increase in the likelihood that they received health/nutrition services at these community events. All these results are statistically significant at the 5 percent level.

Table 6.15: Impact of JEEViKA-MC pilot on utilization of pilot-specific interventions

	Utilization of JEEViKA-MC-specific interventions											
	Shown any videos on health and nutrition in last year			Visited by HSC/Community Resource Person/Community Nutrition Resource Person/ CM in last 6 months			Community events organized by JEEViKA			Received health/nutrition services at community events		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Treatment dummy (= 1 if treatment Gram Panchayat)	0.228	0.234	0.232	0.150	0.152	0.152	0.064	0.068	0.066	0.042	0.045	0.044
	(0.039)	(0.040)	(0.037)	(0.030)	(0.033)	(0.031)	(0.023)	(0.023)	(0.024)	(0.011)	(0.012)	(0.012)
P-value cluster	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.011**	0.008***	0.011**	0.001***	0.001***	0.001***
P-value bootstrap	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.038**	0.037**	0.040**	0.007***	0.006***	0.004***
Comparison arm mean	0.060	0.060	0.060	0.178	0.178	0.178	0.067	0.067	0.067	0.027	0.027	0.027
Observations	2,119	2,114	2,114	2,103	2,098	2,098	1,973	1,968	1,968	1,963	1,959	1,959

Source: Authors' calculations.

Notes:

1. *p < 0.10; **p < 0.05; ***p < 0.01
2. Standard errors in parentheses
3. Regression specification accounts for survey design (clustering at Gram Panchayat level), with block-level fixed effects. Both clustered and wild bootstrapped p-values have been estimated for each specification
4. The first column in each table reports the unadjusted base specification, i.e., the coefficient on the treatment indicator without controlling for any additional characteristics. Each subsequent column adds a set of covariates: column 2 adds those baseline covariates that were unbalanced at the 10 percent level, and column 3 controls for these baseline unbalanced characteristics as well as other relevant baseline characteristics
5. Baseline covariates unbalanced at 10 percent include: HH size, no. female HH members, HH head is General caste, HH has electricity, HH floor is made of improved material, respondent woman's husband is HH head, highest number of years of schooling in the HH (female) and dummy for respondent woman being an agricultural laborer. The full list of covariates includes: all those covariates unbalanced at 10 percent; in addition, the number of assets owned by the HH, caste of HH head, HH head is Muslim, 10 dummies for HH demographic structure, any female HH member has bank account, respondent woman age, dummies for respondent woman being a non-agricultural day laborer or a housewife.
6. Endline comparison arm mean values are provided for comparison

6.4. Exposure, Trial, and Adoption of Key Messages

This section addresses exposure to messages, trial of the behavior being recommended, and adoption of that behavior into regular practice. Based on the content of the BCC we developed a list of key messages being promoted by the pilot. For each of these messages, we asked whether women in the treatment arm were more likely to have heard the message, and (conditional on having heard it) whether they were more likely to have tried the key health and nutrition behavior being promoted in the message.

We should clarify here that this set of questions is distinct from the knowledge module, results of which were presented in the previous chapter, and responses cannot be compared. In this exposure module, a key message was read out and the woman was asked if she had ever heard that message. If she responded in the affirmative, subsequent questions about where the message had been heard, whether she had tried it, whether she had adopted it and, if not, why not, were posed. An example of the difference between the two modules could be as follows: the knowledge module asks "What are the components of a tri-coloured meal?", while the exposure module asks "Have you ever heard the message "All members of the household should eat tri-coloured food"? Thus, a woman can respond in the affirmative to having heard a message even if she has not imbibed the knowledge the message was trying to impart.

More than 70 percent of the women have heard messages on handwashing practices, washing vegetables before cutting, and exclusive breastfeeding in the treatment arm (**Error! Reference source not found.**-6). Other major messages that were heard include care during pregnancy, child morbidity assistance, and colostrum feeding. About 20 percent–40 percent of women report awareness about other key health and nutrition messages. Apart from a few messages (e.g., those around feeding colostrum, mother care during pregnancy, and exclusive breastfeeding until 6 months), the exposure among the women in the treatment arm is significantly higher than in the comparison arm.

Next, we examine whether women who have been exposed to these messages ever tried the specific health and nutrition behavior recommended in the message. We find that for 9 out of the 12 key messages, more than 90 percent of the women who had heard the message also practiced it at home (**Error! Reference source not found.**-7). Though not all of the differences are significant, we can see that there is a higher proportion of women practicing these health and nutrition behaviors promoted in the messages in the treatment arm as compared to the comparison arm. There is a statistically significant difference in the trial rate between women in the treatment and comparison arms for two behaviors: feeding children ages 6–23 months tri-colored food and growing vegetables in the kitchen garden.

Finally, we examine whether women who tried the promoted health and nutrition behaviors continued to practice them at the time of the endline survey (**Error! Reference source not found.**-8). A few messages, like washing hands and washing vegetables before cutting, have been adopted, with prevalence rates significantly higher in the treatment arm. For 5 out of the 12 key messages, more than 80 percent of women who tried the behaviors recommended in the messages also continued to practice it. These include eating tri-colored food for mother and child, adding oil to child's food, handwashing, and vegetable-washing practices.

Finally, **Error! Reference source not found.**-9 presents exposure, trial, and adoption of key messages disseminated by the JEEViKA-MC pilot. This figure presents unconditional averages for trial and adoption of messages, which means that for constructing the average trial rate, we do not condition on exposure to the message. Similarly, for the adoption (continued practice), we do not condition on exposure to and trial of the message. The orange dots represent the means in the treatment arm, while the patterned light orange bars represent the comparison arm mean. We find that exposure, trial, and adoption are all higher in the treatment arm as compared to the comparison arm. Overall, once the woman is exposed to the message, the

trial rates are quite high, though there seem to be barriers to longer-term adoption of various recommended practices.

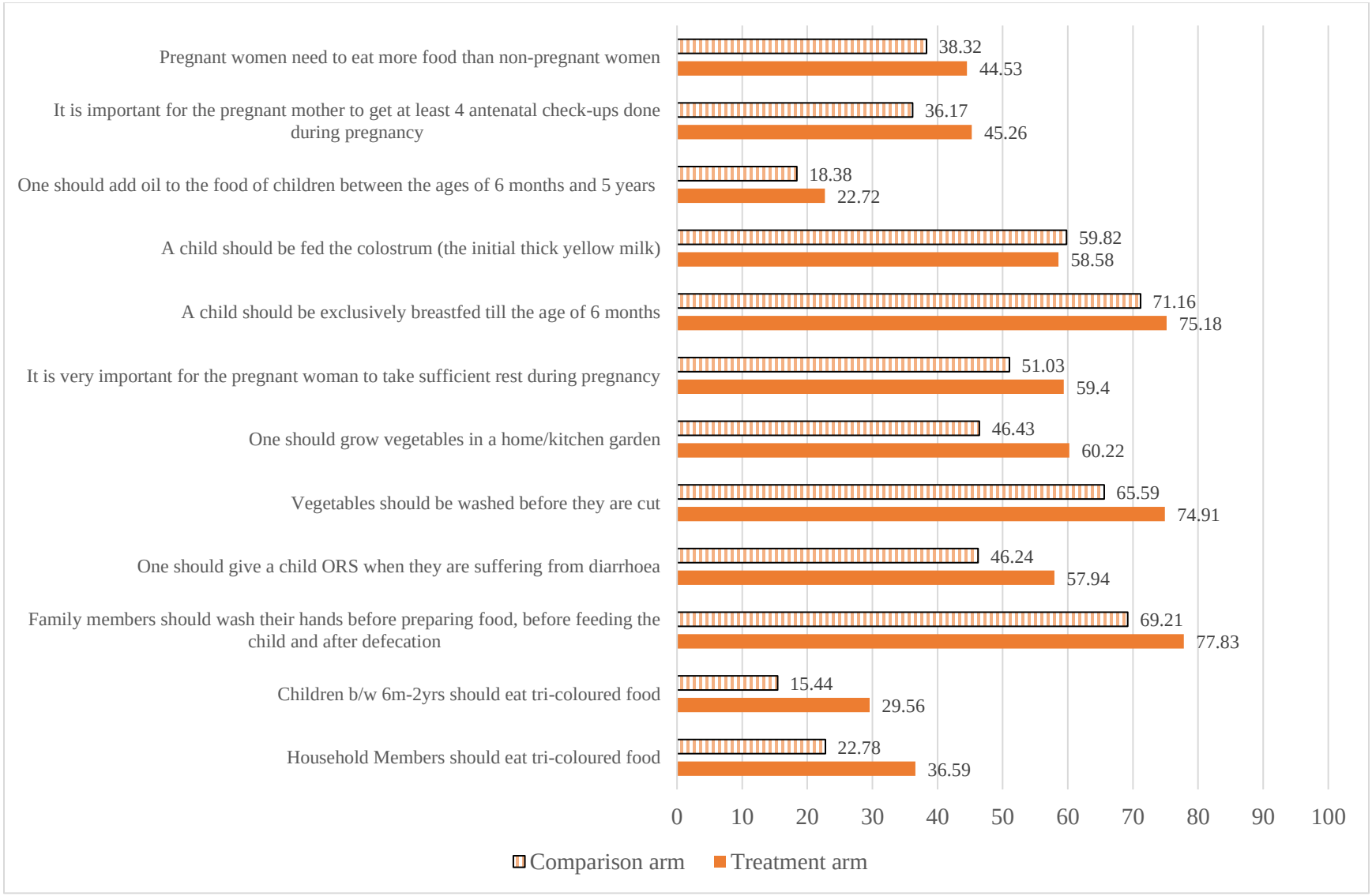

Figure 6-6: Percentage of women who heard the message at endline, by treatment arm

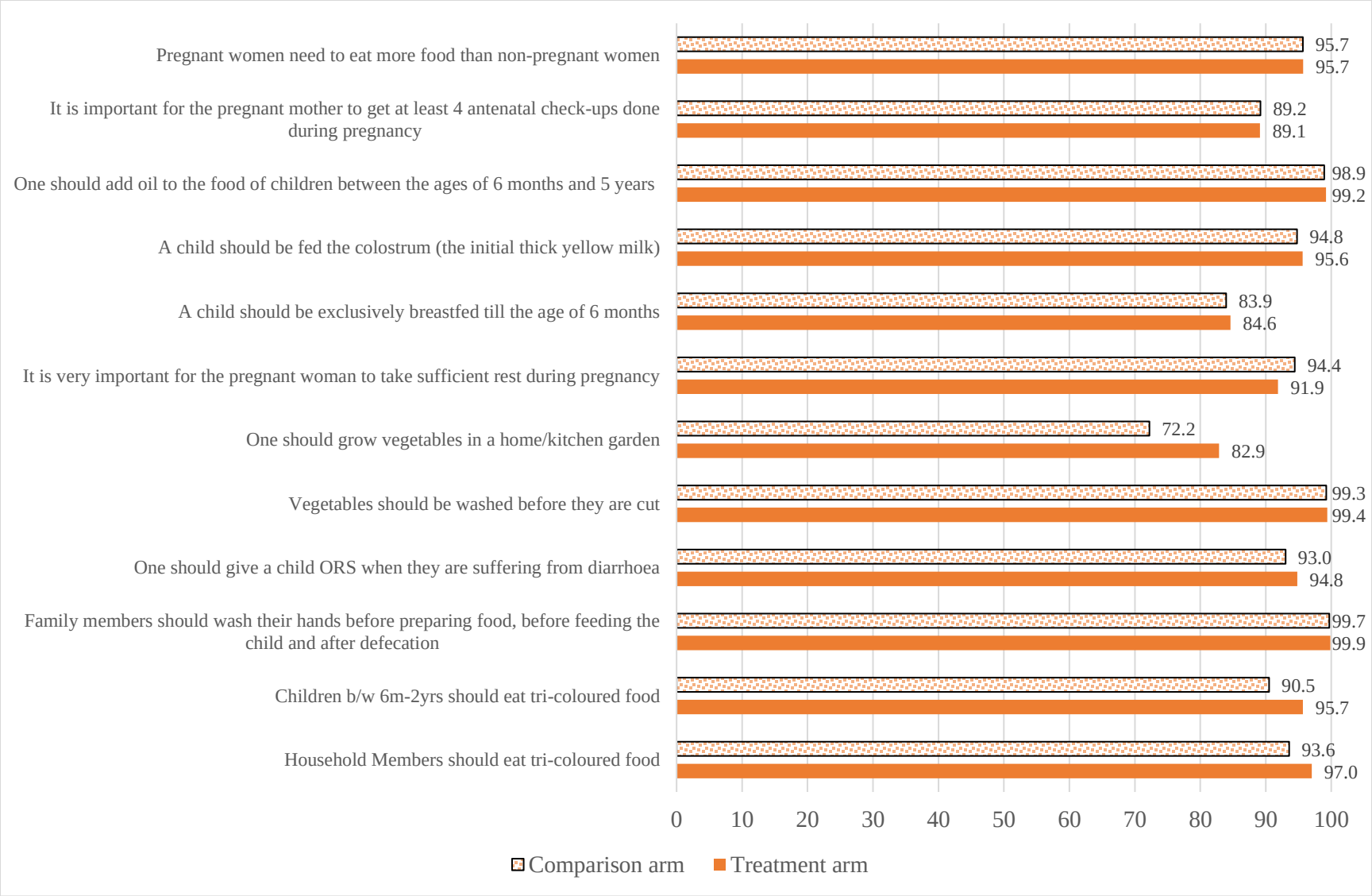

Figure 6-7: Among those who had heard the message, the proportion who ever tried it at home at endline, by treatment arm

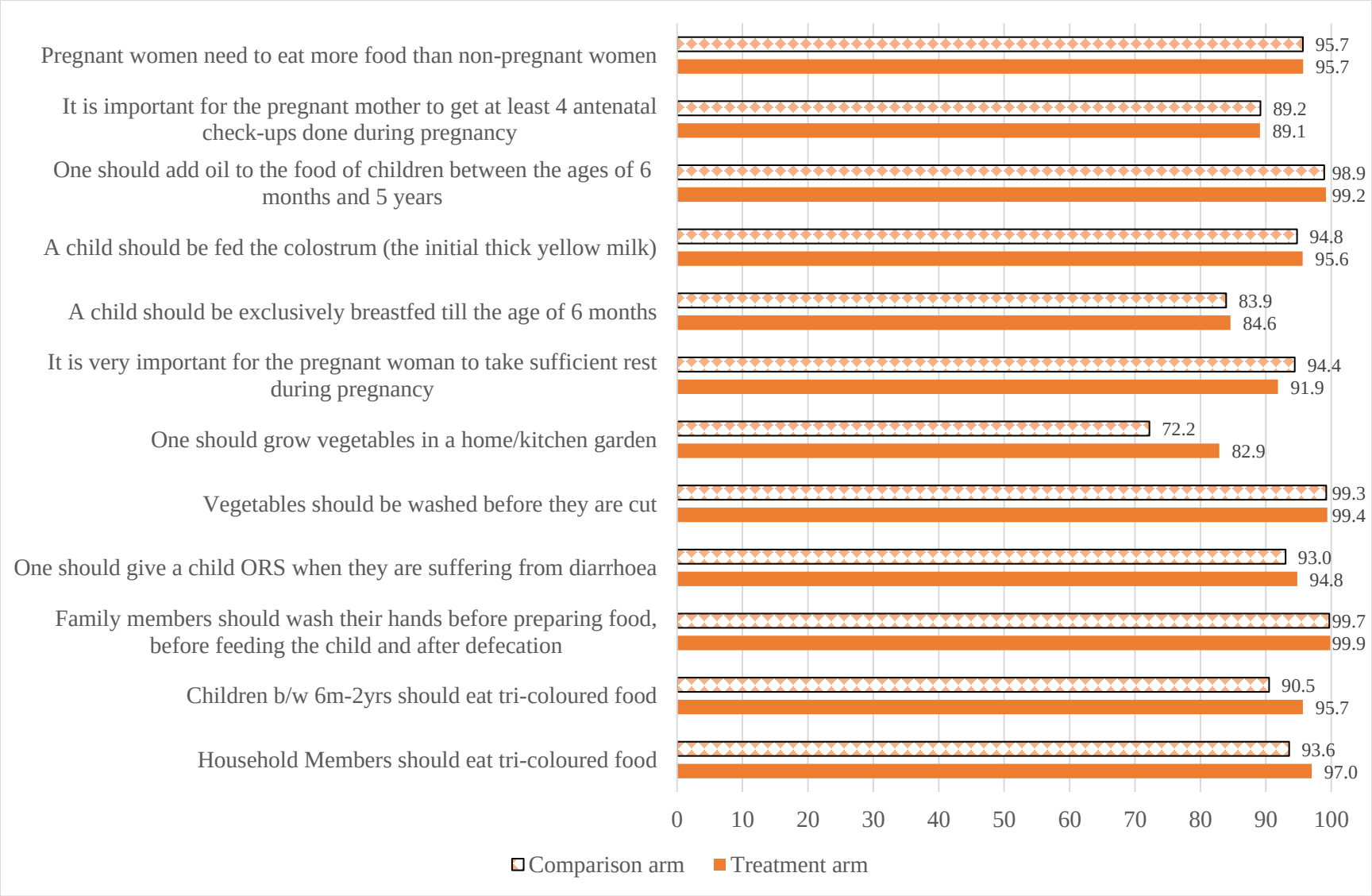

Figure 6-8: Among those who had ever tried a behavior,, the proportion who adopted the practice at home at endline, by treatment arm

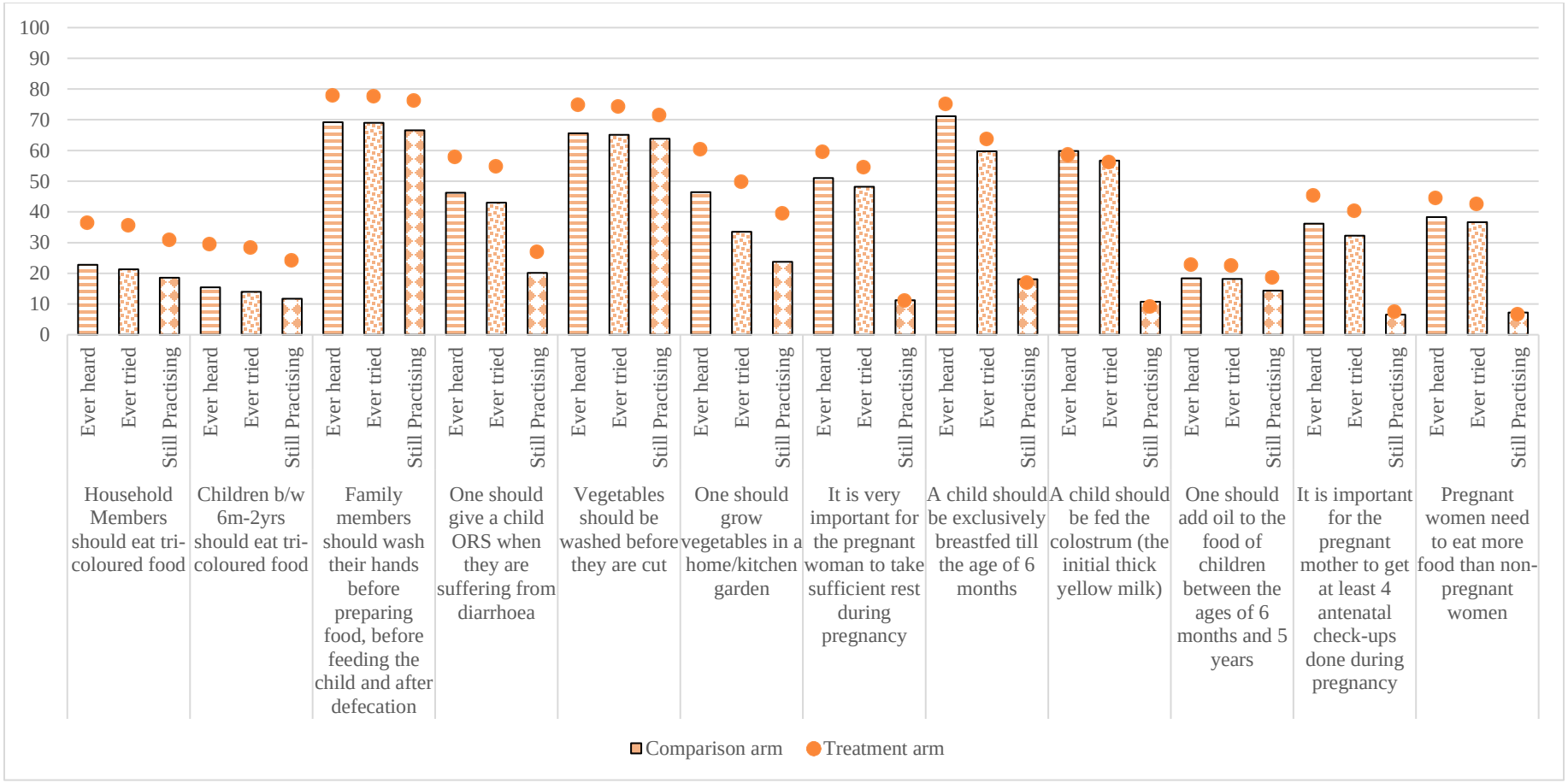

Figure 6-9: Exposure, trial, and adoption of message at endline, by treatment arm

7. RESULTS: COSTING STUDY

In this chapter we estimate the cost of implementing the JEEViKA-MC pilot, to better understand the costs involved in engaging SHGs to improve health and nutrition outcomes. We estimate the cumulative total financial cost and per unit costs of implementing the pilot. We describe in detail how we estimate each of these costs and the units we use to assess per unit costs.

Chapter 7: Overview

Research question addressed: What is the cost of providing the JEEViKA-MC interventions?

Outcomes analysed: Total and per unit costs of delivering the pilot interventions

Main findings

- The total cumulative cost of implementing the pilot—including the cost of the feasibility phase—was approximately US$420,354.
- BCC delivery accounted for about 71 percent of total costs. Overall project activities accounted for 25 percent.
- The total cost per SHG was US$264, per target beneficiary was $110, per SHG member was $22, per SHG meeting was $4.89, and per SHG member per SHG meeting was $.49.
- The feasibility phase accounted for about 44 percent of the total cost of the intervention. However, this is also an artefact of the short window of implementation. Since these costs were sunk costs, a longer period of implementation would mean that their contribution to overall costs would decline.
- When we account for 50 percent of the financial cost of the feasibility phase, the per SHG cost of implementing the pilot drops from US$264 to $206, and the per SHG member per meeting cost for implementing the pilot drops from $0.49 to $0.38. However, when we exclude all the costs incurred in the feasibility phase (treating them as sunk costs), we have a per SHG implementing cost of $148, per beneficiary cost of $62, per SHG member cost of $12, per SHG meeting cost of $2.75. and per SHG member per meeting cost of $0.27.

7.1. Methodology

To assess the cost of implementing the JEEViKA-MC pilot, we adapted the Activity-based costing ingredients (ABC-I) method. The ABC-I method calculates program costs from inputs, input quantities and input unit costs (Kaplan and Anderson 2004; Fiedler, Villalobos and de Mattos 2008; Tan-Torres Edejer et al. 2003), thus combining the activity-based accounting method with the ingredients method. To estimate the cost of implementing the JEEViKA-MC pilot, we begin by identifying the different cost categories or line items that may be part of the budget for such a pilot. These include staff time, material development, training costs, travel costs, management costs, and overheads. Although this information is possibly easily accessed from financial accounts of the program, these need to be further classified into how the different line items were allocated across the different components of the program. For the JEEViKA-MC pilot, these different components are the following:

1. The nutrition BCC and increasing awareness of other existing programs (BCC)
2. Coordination and convergence (CC)

To understand the ingredients, activities, and associated costs of each intervention component, a thorough understanding of how the interventions were implemented is essential. For this we relied on

focus group discussions with program staff, and on key informant interviews with program staff, implementers, and managers. The initial key informant interviews and process tracing for the pilot, undertaken at the time of the PE, were key to developing an activity list for each of the intervention components (Table 7.1). It is evident that some of these activities can be classified into one of the two intervention components, while others cannot. An example of costs that cannot be categorized as belonging to only one category are the costs incurred in the feasibility phase of the pilot. Since the intervention was being conceptualized and tested at this stage, it is difficult to ascribe these costs to the specific components (BCC or Convergence and coordination) of the intervention.

Table 7.1 List of activities for the JEEViKA-MC pilot

Phase	**Activity**
Feasibility phase 2013–2015	Assigning staff (either existing or new hires) Field visits to understand the context Developing materials Testing materials Designing intervention components
Rollout and implementation Years 1 & 2 (2016–2018)	Printing materials Appointing staff to the intervention roles Orientating and training BCC disseminating by CM at SHG meetings Home visiting by CM Community events Disseminating nutrition videos Forming committees Reviewing meetings Monitoring

Cost data were collected in 2019 after the intervention activities had ended. A field visit was planned to collect data on different cost drivers to assess the cost of implementing the pilot activities. The aim was to gather overall information on the costs of staff time, materials, services, transport, travel allowance, logistics, and other costs, together with the implementation timelines and frequency for the activities under each intervention component. This process included interviews with staff in Patna, Saharsa, and the three intervention blocks (Saur Bazaar, Sonbarsa Raj, and Pattarghat). The cost data were collected from the different offices and key informants in the following categories[15]:

1. BCC materials
2. Training
3. Staff time
4. Delivery related (excluding staff time)
5. Convergence and coordination-related activities
6. Monitoring
7. Administrative (those that cannot be allocated to the above categories)

It is important to note the following caveats before we present the cost estimates:

1. In this cost estimation exercise we estimate the financial cost of implementing the pilot and not the economic cost. For example, we use in our analysis the actual salaries paid to the staff of the intervention instead of estimating their opportunity cost of working in the intervention and using that.

[15] Detailed cost data can be provided upon request.

2. Since no new offices were rented or built, or vehicles bought for the purpose of the pilot, we do not take into account such capital costs related to rents, maintenance, or other such logistics as these were functioning similarly in treatment and control areas.
3. Because the cost data were collected retrospectively, we do not have yearly implementation cost data across all categories, which limits our ability to estimate annual costs for the implementation.
4. We use a three-year average exchange rate between INR and US Dollars (US$) to convert the costs from INR to US$.

7.2. Cost Estimates

Before we present the aggregate cost estimates, we briefly describe the different cost categories and how and where these were incurred:

1. BCC materials: For any intervention that deals with disseminating information, or BCC, developing materials are key. These materials are for aiding training of trainers and can be used as job aids by program staff at the field level. For the JEEViKA-MC pilot, these materials were first developed and tested during the feasibility phase (2013–2015). This cost category, in addition to the costs of developing the modules, also includes the cost of reproducing and distributing the materials. This was undertaken by JEEViKA and the JEEViKA Technical Support Program (JTSP).
2. Training: Training and orientation of trainers and project staff/cadres are key to the success of a BCC intervention. These costs include rentals for the training venues; food and beverages provided; boarding and lodging (if residential); and transport costs. Since trainings were conducted at all levels we have the cost data from Patna, Saharsa, and all the blocks in the treatment areas. The staff time spent in this category is accounted for in the staff time category we discuss next.
3. Staff time: This is time spent by all program staff and World Bank consultants on various activities—testing training materials, training, delivery and implementation support, monitoring, and administrative. These data were gathered through detailed interviews with different program staff to allocate their time during the 27 months of the pilot across these different activities. We have these data from Patna, Saharsa, all the blocks in the treatment areas, and the World Bank consultants.
4. Delivery related (excluding staff time): The delivery of the intervention consists of delivering the BCC messages at SHG meetings, follow-up home visits, dissemination of nutrition videos, and organizing community events. Most of these activities are performed by the CM with support from other cadres such as nutrition Community Resource Person and Health Sub-committee members. This cost category consists of material, travel allowances, and incentives for the cadres.
5. Convergence and coordination related: This component of the intervention required the program staff to convene meetings and link communities with government frontline workers, help them access government services, and try to resolve supply-side issues. This category primarily consists of staff time and travel costs.
6. Monitoring: The intervention activities were monitored by staff at all levels. This was done by field visits to observe delivery and collect monitoring data.
7. Administrative (those that cannot be allocated to the above categories): This consists of administrative tasks of keeping records and coordination with other partners at higher levels.

In addition to cost data, we collected data on the total number of SHGs, women within these SHGs, and the target beneficiaries—defined as those in the first 1,000-days window—reached in each block.

The intervention had two phases: a feasibility phase of about two years and the rollout and implementation phase of slightly more than two years (27 months).

Table 7.2 provides a detailed breakdown of intervention component specific costs for the JEEViKA-MC pilot. The table also presents the aggregate costs and fraction of total costs per intervention component, and some estimates of per unit costs.

Table 7.2 Financial cost of implementing the JEEViKA-MC pilot in US$, by component and activities

	Overhead costs		Nutrition BCC & building awareness of existing programs		Convergence & coordination		Total intervention costs
Activities	Staff time	Materials, services, transport, other costs	Staff time	Materials, services, transport, other costs	Staff time	Materials, services, transport, other costs	
Development and reproduction of training materials	0	0	137,050	50,604	0	0	
Training	39,334	1,881	0	9,989	0	0	
Delivering the intervention component and implementation support	5,014	1,178	75,586	23,549	18,958	233	
Monitoring	29,933	2,293	0	0	0	0	
Other costs	4,023	0	0	0	0	0	
Column totals	78,304	5,352	212,636	84,143	18,958	233	
Total component specific cost	83,656		296,779		19,191		
Share of total cost	21%		74%		5%		
Cost per SHG	53		187		12		251
Cost per target beneficiary	22		78		5		105
Cost per SHG per meeting	0.97		3.45		0.22		4.65

Source: Authors' calculations.

The total cumulative cost of implementing the pilot was approximately US$420,354. Of the total costs, about 25 percent was spent on overall project activities (those that cannot be attributed to only BCC or Convergence and coordination). The BCC component accounted for 71 percent of the total cost and the Convergence and coordination accounted for 5 percent. We examine the per SHG, per SHG target beneficiary costs, per SHG member, per SHG per month, and per SHG member per meeting, and report on the range of cost estimates obtained due to the varying size of the denominator. A total of 1,591 SHGs were covered in the intervention. A total of 3,823 target beneficiaries (women and children in the 1,000-day window) were reached. To examine the cost per SHG meeting, we use 1,591 × 54 (the total number of meetings conducted per SHG during the intervention where health and nutrition messages were disseminated).

Although informative, the aggregate and per unit costs shown in

Table 7.2 include the financial costs of the feasibility phase, which was quite long and expensive. Figure 7-1 depicts the allocation of the total cumulative cost across the feasibility phase, material development and replication, training, implementation, and monitoring. The feasibility phase accounted for over 44 percent of the total cost of the intervention. This is a large fraction of total costs given the short window of implementation of the pilot, but if implementation were continued over a larger horizon this fraction would reduce. Programs have to invest large amounts of resources in the feasibility phase to design an intervention which can be scaled up; so, in that sense, many of the costs incurred in the feasibility phase can be considered as upfront fixed costs or sunk costs.

Table 7.3 provides estimates of the per unit costs under different assumptions of the financial cost of the feasibility phase. When we account for 50 percent of the financial cost of the feasibility phase, the per SHG cost of implementing the pilot drops from US$264 to US$206, and the per SHG member per meeting cost for implementing the pilot drops from US$0.49 to US$0.38. However, when we do not include any of the costs incurred in the feasibility phase (treating them as sunk costs), we have a per SHG implementing cost of US$148, per beneficiary cost of US$62, and per SHG meeting cost of US$2.75.

Since this is one of the first studies to estimate the cost of implementing a nutrition BCC intervention using SHGs as the delivery platform, we do not have access to cost estimates from other studies to compare the estimated implementation costs of the JEEViKA-MC pilot.

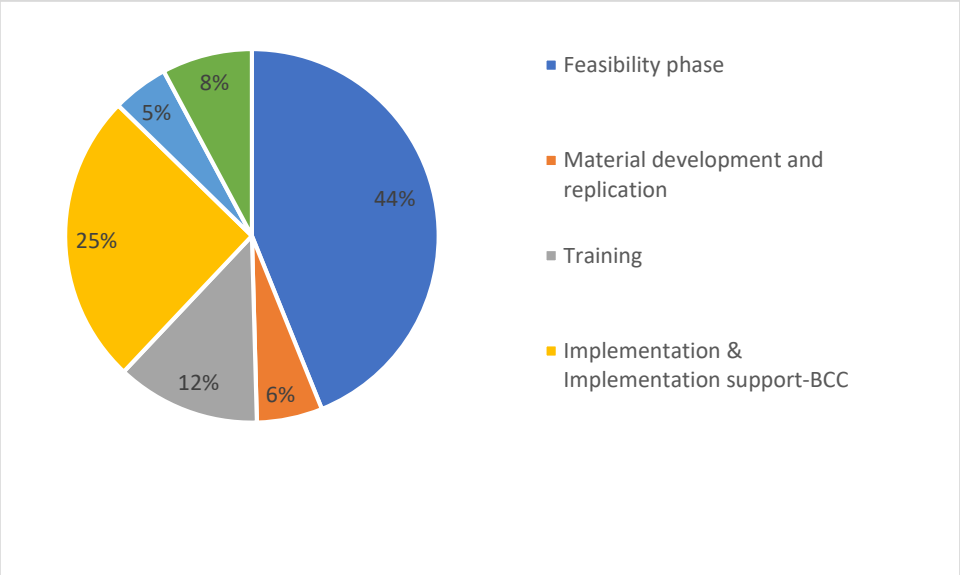

Figure 7-1 Allocation of total costs by activities

Table 7.3 Estimates of per unit costs under different scenarios

	Cost per SHG (US$)	Cost per target beneficiary (US$)	Cost per SHG meeting (US$)
Accounting for full feasibility phase costs	264	110	4.89
Accounting for one-half of the feasibility phase costs	206	86	3.82
Accounting for one-quarter of the feasibility phase costs	177	74	3.28
Not accounting for the feasibility phase costs	148	62	2.75

Source: Authors' calculations.

8. CONCLUSIONS AND RECOMMENDATIONS

In this chapter we reflect on the performance of the pilot in terms of impact, implementation, and financial cost. We also discuss how our findings relate to findings from similar interventions and make some recommendations for programs of this type.

8.1. Impact: Evidence from health and nutrition outcomes

The key findings of the impact evaluation are that the JEEViKA-MC pilot had small but significant impacts on reported dietary diversity for both women or children, but no impact on anthropometric outcomes for either. The intervention appears to have worked through anticipated pathways, delivering higher exposure to key messages on nutrition through the self-help group platform, and contributing to improved knowledge about nutrition and improvement of some practices among women covered by the pilot program.

As noted elsewhere in the report, the health and nutrition BCC component of the pilot seemed to have worked relatively well. We find positive impacts on *knowledge* of health, hygiene and nutrition practices among women in the treatment arm. We also find positive change in several *practices*, such as dietary diversity (among women and children), continued breastfeeding at two years of age, timely introduction of complementary foods, and provision of ORS to children with diarrhea. There were positive impacts on awareness of the Health Risk Fund and Food Security Fund, and women in the treatment arm were significantly more likely to use the Food Security Fund to purchase food. We also find a small positive impact on cultivating a kitchen garden. However, we find no impact on preventive/curative health seeking behaviors (except of giving ORS) or sanitation and hygiene practices.

Despite the improvement in some of the key underlying determinants mentioned above, we find no impact on the immediate determinants of morbidity among children and household food security, or on anthropometric outcomes for women or children. This implies improvements in dietary diversity and greater uptake of the food security fund did not ultimately lead to improvements in anthropometric outcomes and household food security. One possible explanation is that the duration of the pilot was too short to reasonably expect impact on anthropometric measures, which are a result of many interrelated factors. The second possible explanation is that, despite improvements, the quantity and quality of food being consumed was not enough to reduce the prevalence of underweight among women. A closer look at the diets of children reveals that the impact on dietary diversity came primarily from higher consumption of vitamin A-rich fruits and vegetables in the treatment groups. The consumption of eggs and flesh foods (e.g., meat, fish, or chicken) was very low even at endline, despite families self-identifying as *non*-vegetarian. Improvements in reported dietary diversity for women came primarily from pulses, fruits, and dairy, and from a protective effect of the intervention on consumption of green leafy vegetables. Gaps still remain, with more than 50 percent of women not meeting minimum dietary diversity even in the treatment arm, suggesting that more effort is needed to close barriers to consumption, and to improve dietary diversity and consumption of iron-rich foods in this setting. We did not collect information on quantities of different foods consumed, an important factor in enabling changes in anthropometric outcomes.

To place these results in context, we referred to studies covered in Kumar et. al 2017 to identify evidence on the impact of women's group-based interventions on maternal and child nutrition outcomes. This review summarizes evidence from 36 studies, published between 1980 and July 2016, reporting on 24 nutritional indicators across infant and young child feeding (IYCF) practices, intake/diet, and anthropometry. In addition to these studies, we identified more recent peer reviewed journal articles that evaluate the link between women's group-based interventions and maternal and child nutritional status in South Asia region.[16] The findings of our evaluation are largely consistent with what other such

[16] Please refer to Appendix xx for more details.

studies have found. The literature indicates that although several studies found an impact of group-based interventions on dietary diversity either for mothers or for children, very few studies found an impact on anthropometric outcomes or on morbidity. The magnitude of the impact of the pilot intervention tested in our study is somewhat lower than in the most recent study from India (Nair et al., 2017), likely due to more diluted implementation in this programmatic context.

In addition to group-based interventions, our overall findings are in line with findings from a recent review of agriculture-nutrition program evaluations (Ruel, Quisumbing and Balagamwala 2018), which reiterated the positive impacts of agricultural interventions on diet diversity, as well as more limited impacts on anthropometric outcomes. Our findings are also in line with findings from evaluations of other large-scale behavior change interventions implemented by the global initiative, Alive & Thrive. Taken together, these various studies suggest that although improvements in dietary diversity can be achieved through diverse efforts to support behavior change, this may not be translating into sustained daily consumption of foods that promote linear growth. Trials that included food or cash supplements in Bangladesh (Ahmed et al, 2018) with behavior change efforts were more successful in supporting improvements in child growth outcomes.

The full set of results from the impact evaluation is presented at the end of this chapter, in Table 8.1.

8.2. Implementation: what worked, what didn't, and why

To place these impact results within the program framework, we draw upon the lessons learnt during the course of the impact evaluation and the mid-course process evaluation study conducted in 2017. A brief summary of the findings from the process evaluation is presented below in Box 8.1. We find that the platforms seem to be functioning, with women reporting being active members of these groups at both baseline and endline. Those in the treatment group were more likely to have discussed topics related to care during pregnancy, care and feeding of newborns and young children, dietary diversity, kitchen gardens, core JEEViKA funds and government schemes – topics being promoted as part of the pilot. However, topics that were common to all SHGs regardless of their treatment status, e.g. savings and loans, were not discussed differentially across arms. Exposure to the Digital Green video messages, disseminated as part of the pilot, is much higher among the households in the treatment areas compared to those in comparison areas. These videos were screened primarily at the CM's home – indicating, among other things, interaction with the CM.

The health and nutrition BCC component of the pilot seems to have worked well despite several challenges identified in the process. Unfortunately, the convergence and coordination component did not work so well. This second component underwent considerable transformation over the course of the pilot. To begin with, the formation of convergence committees and activation of community events occurred in a staggered manner due to delays in the execution of official orders. The formation of the block-level convergence committees was only completed in February 2017, while the panchayat-level committees in Pattarghat and Saur Bazaar were only formed in March 2017. The convergence and coordination committees were discontinued soon after their formation, in July 2017, due to difficulties in scheduling regular meetings; instead, greater emphasis was placed on Integrated Child Development Scheme-organized community events like the Annaprashan and Bachpan Diwas. Subsequently, support to these events was also discontinued and the Health Sub-committee (HSC) was tasked with the work of convergence and coordination. Training of the Health Sub-committee was ongoing at the time the process evaluation began, implying that the effective period of their integration into the pilot—and hence of the implementation of certain components like home visits and participation of the Health Sub-committee in Integrated Child Development Scheme events—was about one year.[17] A new cadre called the Community Nutrition Resource Person was introduced in June–July 2017, with several roles: they were expected to visit the Village Health Sanitation and Nutrition Day, Annaprashan Diwas and

[17] Based on the planned endline. In the end, however, the endline was moved by 6 months, meaning that the health subcommittee functioned for about 1.5 years in total (assuming implementation continued till the endline survey).

Bachpan Diwas, monitor the rollout of BCC, visit Village organization meetings to facilitate health and nutrition discussions there, and support the Health Sub-committee in their training and home visits.[18]

Several of the challenges associated with assessing the convergence and coordination component become apparent both in the impact estimates and in information about delivery of specific components. For example, even though home visits were reported almost twice as often by women in the treatment arm compared to those in the comparison arm, it is not clear from the responses whether these home visits were made by the Health Sub-committee or cadres other than the CM, as intended under this component. It proved hard to capture quantitatively efforts made under this component. Second, while women in the treatment arm were also more likely to report that a community event (such as a nukkad natak or camp for child checkups) was organized by JEEViKA as compared to those in the comparison arm, the proportion of women reporting this is small (12 percent in the treatment arm, 6 percent in the comparison arm). Again, it is hard to assess whether this low reporting is because these events did not happen, or women were unable to distinguish between events held by JEEViKA and other community events. In addition, we cannot rule out contamination of women in the comparison arm through attendance in these community events.

While women in the treatment arm were more likely to have heard messages related to dietary diversity, cultivating a kitchen garden, sanitation practices, giving ORS and care during pregnancy, exposure was still quite low, with less than 50% of the women having heard these messages. Exposure to several other messages was similar across the treatment and the comparison arms. Part of the reason for this could be the generic nature of the messages, which meant that they were likely to be transmitted through several mechanisms.

The pilot depended heavily on the effectiveness of one worker, the CM, on whose shoulders the bulk of the implementation rested. During our process evaluation, we found that many CMs had not been paid for long periods of time, on occasion exceeding a year, which affected their motivation and willingness to work. Given their unique position in the system, and their close access to the women, their time was in great demand, with the responsibilities of other programs also falling on them. We saw this ourselves in the case of two schemes, the sanitation drive and the life insurance scheme, where CMs were being asked to complete additional surveys or help members register during normal SHG meeting hours. Competing requests on the CM's time may have diluted implementation intensity.

Finally, the training of the CMs could have benefitted from streamlining and reinforcement. CMs in the treatment arm were provided two sets of BCC training (one by JEEViKA Technical Support Program staff and the second by World Bank consultants) and were thus given two sets of instructions that might have been confusing. CM knowledge of the BCC content was not always up to the mark[19], however, the real shortfall was in their ability to relate existing JEEViKA platforms to the BCC content being delivered – e.g. how to use the Food Security Fund to purchase food, or how to build and maintain kitchen gardens year-round. Refresher trainings that specifically laid out the JEEViKA interventions and their link to health and nutrition (in addition to reiterating the BCC content) may have improved the functioning of the CM.

Finally, the structure of the JEEViKA hierarchy made implementation of the pilot difficult. With a very top-down approach to the program, many upper-level staff were tasked with allocating and supervising tasks without any real appreciation of the amount of time and effort it took to implement them on the ground. With orders coming from the state or district teams and little involvement of block level teams

[18] There were also challenges with the JEEViKA structure, staff shortages and staff ownership and buy-in that were identified in the Process Evaluation report, also summarized in Box 8.1.

[19] While CM knowledge was better in the treatment arm than in the control arm, there was considerable room for improvement, and indeed in our PE report we noted some areas of knowledge where CM performance appeared to have deteriorated since baseline.

in trainings, dissemination of findings or discussion of next steps, local buy-in was minimal, and the pilot was not given priority. This aspect of implementation is one that should be addressed during the scale-up of the program.

Implications of the PE findings on the implementation of the JEEViKA-MC pilot

IFPRI conducted a mid-term process evaluation (PE) from April to May of 2017 (about 14 months prior to the endline survey). The PE examined the performance of the JEEViKA-MC pilot along five broad domains: implementation platforms, training and awareness of roles, implementation processes, exposure of SHG households to key messages, and utilization of the intervention. An important finding of the PE was that very few differences in exposure were observed across households in the treatment and comparison arms. In addition, differences in knowledge and utilization between households in the treatment and comparison arms were minimal and few improvements in knowledge were seen in the treatment arm between baseline and the mid-term PE. There were several other findings related to the implementation that emerged from the PE that are useful to keep in mind while evaluating the impact of the MC pilot presented in the current report.

Things that were working well:

- The implementation platforms (these included the SHGs, Village organizations, procurement committees) were in place and functioning.
- JEEViKA staff and key cadre's knowledge of the aim of the project and of their specific roles and responsibilities was good.
- The content of the BCC was accurate and comprehensive.
- The CMs in the treatment arm had better knowledge around the BCC topics and the Health Risk Fund, Food Security Fund, and kitchen gardens.
- Majority of the SHGs were discussing health and nutrition topics during their meetings.
- Women in treatment areas were more likely than those in the control areas to report discussing health and nutrition topics.

Things that were not working so well:

1. **Changes and delays to the intervention:** Repeated alterations to the convergence and coordination component, including the discontinuation of convergence committees and the addition of new cadre along with delayed orders meant that many aspects of this component functioned for considerably less than the full term of the pilot.
2. **BCC content:** First, providing two separate trainings on similar but slightly different BCC content (by JEEViKA Technical Support Program and the World Bank) to the same sets of Master Trainers and Block Health, Sanitation and Nutrition Integrators could have led to confusion and to inconsistencies in the messages being delivered. Second, messages being delivered by the CM were generic, and could have reached the comparison arm households through several other channels – leading to diluted measures of impact of the intervention.
3. **JEEViKA structure:** The top-heavy nature of the JEEViKA structure—with many layers of individuals, a complex reporting system, and multiple requests on the same frontline worker or cadre (the CM/Community Coordinators, respectively)—was a key challenge. Several of the higher-level staff at the district and state levels supervise multiple JEEViKA activities but do not work directly on the pilot. This results in a limited appreciation of the multiple requests being made on lower-level staff, and of the many additional responsibilities that have been given to the Community Coordinators and CMs. These responsibilities distract them from their main tasks under the pilot and take up time that could otherwise be spent on the nutrition intervention during SHG meetings.
4. **CM workload and payments:** As noted above, the CM was tasked with multiple responsibilities, several of which were unrelated to the pilot, with limited appreciation by their superiors of this. In addition, many CMs had not received their salaries for many months and had also not received the incentives for displaying the Digital Green videos and providing the nutrition BCC. In the absence of timely remuneration, and with the ever-increasing list of responsibilities, it is perhaps unsurprising that CM motivation was low.
5. **CM training:** Training of CMs seemed inadequate, based on findings regarding CM knowledge of the BCC content. To address this, we recommended refresher trainings for both CMs and their supervisors. We suggested that it would be useful to incorporate content

knowledge assessments into the training, to help assess whether the refresher training sessions are improving content knowledge. Finally, we pointed out the importance of making the link between the health and nutrition BCC and the existing JEEViKA funds and interventions, like the Food Security Fund and the kitchen gardens, during the trainings. In addition to content training, CMs also needed additional training in soft skills, including retaining the attention of the women and delivery of content.

6. **Staff shortages:** Staff shortages emerged as a bottleneck to implementation. There was a shortage of JEEViKA staff and cadres (especially Community Coordinators, Village Resource Persons, and CMs), which made it hard to implement the program.
7. **SHG meetings:** The provision of BCC through SHG meetings posed another set of challenges. Topics other than health and nutrition often took precedence in SHG meetings, and the health- and nutrition-related topics were either not discussed at all or discussed only briefly. Only a few CMs reported using picture cards, games, or flipcharts to disseminate the information. In a population with limited education, such aids increase understanding and retention and generate greater interest in the content. Finally, as mentioned above, no links were made between the information disseminated and the resources available to help women put the suggestions into practice. During SHG meeting observations, only in one meeting did a CM discuss kitchen gardens with the members.
8. **Staff ownership and buy-in:** Until formal training on technical aspects of health and nutrition and a refresher of their responsibilities in overseeing the dissemination of the health and nutrition information was provided in February 2017, JEEViKA staff members (BPMs, Area Coordinators, Community Coordinators, and others) did not feel a sense of ownership toward the project and its outcomes. The delay in formal training on health and nutrition for almost nine months after the roll-out of the intervention could have affected the ability of these staff members to adequately understand or monitor the progress of the BCC component of the pilot. In addition, their limited training on health and nutrition might have impacted their feelings of ownership of the work under the pilot.

Note: The full findings of the process evaluation are available in the process evaluation report (Raghunathan et

8.3. Costs: how much did it cost to implement the JEEViKA-MC pilot?

We estimate the total cumulative cost of implementing the pilot to be approximately US$420,354. About 25 percent of this total was spent on overall project activities (those that cannot be attributed to only BCC or Convergence and coordination), the BCC component accounted for 71 percent and the Convergence and coordination accounted for 5 percent. The cost per target beneficiary was estimated to be US$110, and the cost per SHG member per meeting was US$0.49.

Of the total amount, we found that the feasibility phase accounted for about 44 percent of total costs. Since these were up-front fixed costs, the per unit cost of implementing the intervention would decline as the duration of implementation increased. When we exclude 50 percent of the financial cost of the feasibility phase, the per SHG cost of implementing the pilot drops from US$264 to US$206, and the per SHG member per meeting cost for implementing the pilot drops from US$0.49 to US$0.38. When we exclude all the costs incurred in the feasibility phase (treating them as sunk costs), we have a per SHG implementing cost of US$148, per beneficiary cost of US$62 and per SHG member per meeting cost of US$0.27. These estimates, which do not include any of the costs incurred in the feasibility phase, are the relevant cost estimates for a potential scale-up of the intervention. Assuming 2 meetings per month on nutrition, this works out to about $6 per SHG member per year, which is comparable to the cost of the intervention implemented in the trial by Nair et al. (2017) in Odisha. Other studies that

estimated the cost of implementing nutrition education programs do not present estimates that are comparable to ours.[20] In general, the costs of nutrition-sensitive programs is very limited and particularly so for the types of interventions studied here (Ruel, Quisumbing and Balagamwala 2018).

8.4. Recommendations

The impact evaluation findings summarized above show that the intervention was successful in positively changing some key knowledge and practice indicators. However, our process evaluation highlighted several factors that could have limited the magnitude of impact or the impact on even more outcomes. Based on these insights, we offer some recommendations on some key features of intervention design and implementation, such as platform, content of BCC materials and rollout. We also outline some implications for future research:

Leverage the SHGs for impact. The basic platform—the SHG—seems to be working effectively. Women in the treatment arm are discussing nutrition-related topics at SHG meetings, which suggests the pilot intervention was effective in integrating this content into the ongoing SHG meetings. Additional pilot-specific activities, such as community events and Digital Green videos, also appear to have been implemented. As a result, exposure to key messages among women in the treatment arm is significantly higher. This implies that the basic approach and design have the potential to be successfully leveraged for impact.

Streamline the BCC component and increase relevance for SHG audience and for impact. Although the content of the BCC material was comprehensive, we observe positive change only for a few knowledge indicators and behaviors. In addition, the BCC content—which was heavily targeted to pregnant women and mothers of young children—was not always appropriate for the average SHG woman. The BCC may have been more effective if the content was to focus on a few key areas that were relevant to *all* women who attend SHG meetings. Dietary diversity and food security are two examples of content that is applicable to all. Tighter focus of the content would likely have helped to reinforce key behaviors. If the intent of the program was to target and improve outcomes only for pregnant and lactating women, then more general SHG platforms might not be the most appropriate type of group to do so, given their mixed age and reproductive stage composition. Mothers' groups, focused on women in the first 1000 days, might be a more effective means of reaching the target beneficiaries.

In addition, focusing in on dietary quality, alongside a focus on diversity, might deliver more impacts on growth outcomes. Although we did see impacts of the pilot on reported dietary diversity, this improvement came about through increased consumption of plant-based foods (including pulses) and dairy, but not consumption of animal-sourced foods, even though most households self-identified as non-vegetarian. A recent study in Ethiopia (Kim et al, 2019) found similarly small impacts on dietary diversity, but in that study, improvements came from increased egg consumption, and thus translated into improved child growth. Other recent studies (Headey, Hirvonen and Hoddinott 2018) also emphasize the importance of animal-source proteins to support better child growth in poor settings.

[20] Cost of a health facility-based nutrition education program in Peru was estimated to be $6.12 per child reached and $55.16 per case of stunting prevented (Waters et al. 2006). Another study found that the cost of nutrition education programs ranges from $1-23, depending on context and type of programs (Horton 1992). However, it should be noted that this study was conducted more than 25 years ago and the cost estimates may not be relevant in the current context. A more recent analysis of cost-effectiveness of health interventions in developing countries concluded that provision of complementary food and counseling on nutrition was among the least cost-effective interventions examined (Edejer et al 2005). A more recent study, in Bangladesh, examined an intervention similar to the JEEViKA-MC pilot and reported improvements in diets and anthropometric outcomes among children (Roy et al. 2007). Although they do not report the per beneficiary cost of implementing the intervention, the cost of averting malnutrition was reported to vary between USD19-37.

Limit changes in the intervention components and ensure staff at all levels are motivated to facilitate implementation. As highlighted in the PE report, the JEEViKA-MC interventions and components within them were continuously adjusting, adapting, and changing. Flexibility and the ability to adapt to program and community conditions is important in the initial period of any pilot to develop a good mix of intervention components that will work well and will be acceptable to the target population. However, substantial changes were observed well into the second year of implementation, notably several reassignments of responsibility for the convergence and coordination component and late roll-out of the video-based BCC component (Box 8.1). These frequent changes to intervention components may have contributed to confusion among those implementing on the ground *and* to delays in rollout of specific components, which in turn, may have limited the potential for impact of these components. In addition, it is imperative to ensure that that program staff at all critical operational levels are trained and motivated to support implementation as early in the course of such programs.

Understand and address the multiple barriers to behavior change. Our study reinforces that knowledge about optimal behavior is a necessary—but not sufficient—condition for adoption of optimal practices. For example, even though we found that overall diet diversity improved, there was no increase in the consumption of animal-sourced foods, even though most households self-identified as non-vegetarian. Other barriers such as availability, access (which includes affordability and agency) and, perhaps buy-in from other household members, especially male members, could all be important. Future research should examine these additional barriers to behavior change, such as – What are household members' perceptions of the messages delivered? What is the credibility of the person delivering them? What are the social barriers preventing adoption—such as community sanction/acceptance—even if the household agrees with the message? What kind of access do households have to markets, and what foods can they buy there? What are the economic and other structural barriers (such as time and work load) to adoption of better dietary practices?

Addressing these barriers will require complementary investments and uptake of government services to increase. For instance, the finding that food insecurity remains high clearly suggests that resources are a key constraint to further improvements in diet quality. Animal-sourced foods are more expensive, so—even if preferred— they may need to be limited in favor of a larger quantity of cheaper foods for the household. A BCC intervention with information on dietary diversity is likely to be far more effective in improving diets when bundled with in-kind or cash transfers, or when implemented in a context where household resource availability and basic food security create favorable conditions for consumption of more preferred foods.

8.5. Conclusions

This report presents the endline findings of an impact evaluation of the JEEViKA Multisectoral Convergence pilot, designed as an effectiveness trial, in one district in Bihar, India. JEEViKA, a rural livelihoods project, supports self-help groups (SHGs) – savings and credit-based groups of about 15-20 women, mostly targeted towards those from poor households – with the aim of improving their livelihoods and enhancing household incomes. Two complementary sets of interventions—health and nutrition behavior change communication (BCC) to improve women's knowledge and household practices, and efforts to improve service access through convergence —were layered onto the existing core package of JEEViKA activities and were targeted to women who were members of the SHGs already formed by JEEViKA. Within this target population, households with young children, mothers of young children, and pregnant women were the primary focus of the JEEViKA-MC pilot.

The evaluation, designed as a randomized controlled trial using a panel survey of women with children 6–23 months of age at baseline, finds that the JEEViKA-MC pilot had small but significant impacts on women's and children's reported dietary diversity, but not on anthropometric outcomes for either women or children. The intervention worked through anticipated pathways, delivering higher exposure to key messages on nutrition through the self-help group platform, and contributing to improved

knowledge about nutrition and improvement of some practices among women covered by the pilot program. There were no impacts on utilization of government programs.

The interventions tested in this study were delivered at a cost of $6 per SHG, which are comparable with those of another intervention in Odisha, and with similar but smaller impacts than that research trial identified.

In a context where the women's self-help group platforms are being leveraged across Bihar and indeed, even across India to scale-up behavior change communications in India's national nutrition mission, our evaluation brings rigorous evidence to the knowledge base on the potential for these platforms to have impact. Our findings also highlight some of the key challenges and emphasize that efforts to use women's group platforms to deliver nutrition behavior change interventions should consider the relevance of behaviors that are being promoted, the broad-based nature of the target audiences reached through self-help groups, the role of other factors that support nutrition-related behavior change, and of yet other factors that support the translation of behavior change into biological impact.

We conclude that women's self help platforms like JEEViKA, have some potential to improve nutrition-related behaviors, but recommend that further efforts are needed to address the challenges to implementation and to behavior change that have been identified in this evaluation.

Table 8.1 Summary of key findings on the impact of the JEEViKA-MC pilot

Outcome/area	Key evaluation findings	Interpretation/implications for future programs	Comparison with existing evidence*
Primary outcomes			
- Women's BMI and women's underweight	Mean BMI of women was 19.07 and about 44 percent of women were underweight at baseline No intervention impact, and no change over time in mean BMI or levels of underweight Positive impact of the intervention on awareness and utilization of the food security fund available under the core JEEViKA components	High levels of underweight persist among women despite an increase in awareness and uptake of the food security fund. It is possible that the quantity and quality of food received is insufficient to reduce the prevalence of underweight among women. This finding also suggests that the intervention was able to improve information about entitlements available. However, improving women's well-being will likely require additional (tangible) inputs to improve food security, incomes, or women's workloads, all of which could contribute to underweight among women	Our findings are consistent with results reported in the existing literature. Most of the reviewed studies found no significant improvements in women's BMI due to various women's group-based interventions. Saville et al. (2018): (0) Nair et al. (2017): (0) Malapit et al. (2015): (0) Jalal and Frongillo (2013): (0) Kumar and Quisumbing (2011): (+)
- Child reported dietary diversity	*Index children:* Low reported dietary diversity at baseline (less than one-third achieved MDD) Overall diet diversity improved over time, as expected with increasing child age; small intervention impact on number of food groups (0.16, (p (bootstrap) < 0.1))	Impact comes primarily from higher consumption of vitamin A-rich fruits and vegetables in the treatment groups. Feeding of foods such as eggs and flesh foods (e.g., meat, fish, or chicken) was very low even at endline, despite families *not* self-identifying as vegetarian	The result for child's dietary diversity outcome is mixed. Nair et al. (2017): (+) Malapit et al. (2015): (0) Younes et al. (2015): (0)
	Additional sample of younger siblings ages 6–23 months at endline: High reported dietary diversity (> 50% met MDD) with an intervention impact of 0.3 food groups (p	Similar patterns as for older children with higher DD coming mainly from vitamin A-rich foods. Higher DD among younger children at endline, compared to for index children ages 6–23 months	

Outcome/area	Key evaluation findings	Interpretation/implications for future programs	Comparison with existing evidence*
	(bootstrap) < 0.1) and 8 pp achieving MDD (not significant) in the treatment group, compared to comparison	at baseline, might reflect improved knowledge among mothers and/or seasonality differences in endline survey, or overall secular improvements. However, despite the secular trend improvements, the intervention impact is impressive.	
Secondary outcomes			
- Women's reported dietary diversity	Less than one-third of women achieved minimum dietary diversity of five food groups at baseline. Substantial intervention impact of 10 pp of women achieving minimum dietary diversity at endline	Improvements in reported dietary diversity for women came primarily from pulses, fruits, and dairy, and from a protective effect of the intervention on consumption of green leafy vegetables. Gaps still remain, with more than 50 percent of women not meeting MDD even in the intervention areas, suggesting that more efforts may be needed to close barriers to consumption	The evidence on impact on women's dietary diversity is largely in accordance with our findings, though a couple of studies find no impacts. Harris-Fry et al. (2018): (+) Nair et al. (2017): (+) Harris-Fry et al. (2016): (+) Habib and Jubb (2015): (0) Malapit et al. (2015): (0)

Outcome/area	Key evaluation findings	Interpretation/implications for future programs	Comparison with existing evidence*
- Women's health, hygiene, and nutrition knowledge	Knowledge about health, hygiene, and nutrition among women was balanced across the treatment and comparison arms at baseline. Knowledge of a few IYCF indicators (e.g., early initiation of breastfeeding) was high, but of WASH-related behaviors was low. Knowledge on all intervention-relevant domains was high in both groups at endline, but higher in the treatment areas. Knowledge was especially high for content areas related to dietary diversity and kitchen gardens. There was a positive and statistically significant impact on the overall knowledge score	Although knowledge was high in both groups at endline, it appears that the intervention was successful in improving knowledge in the treatment areas and achieved very high levels, especially for knowledge around dietary diversity and kitchen gardens. Translation of this knowledge into practice (which is still much lower than knowledge levels) will likely require additional inputs	Our results are consistent with the existing studies, most of which do find significant and positive impacts/ associations of the women's group-based intervention on respondents' health, hygiene and nutrition knowledge. Harris-Fry et al. (2016): (+) Younes et al. (2015): (+) Johnson et al. (2014): (+) Prennushi and Gupta, (2014): (0)
- Health practices	*Pregnancy care (mother of youngest child):* High levels of pregnancy registration and reasonable number of ANC visits and giving birth in health facilities was observed at baseline. Intervention impact was seen on number of IFA tablets consumed during pregnancy and on receipt of calcium supplements. No intervention impact on other practices and little change in levels over time.	For some practices, such as ANC-related practices and facility deliveries, levels were already high at baseline, indicating little potential for benefit. The impact on IFA and calcium could also be dependent on supply.	Most of the studies looked at institutional delivery, antenatal care and care seeking behavior to determine the effect of program interventions on health practices. Saville et al., 2018: (+) Nair et al. (2017): (0) Acharya et al. (2015): (+) Saha et al. (2015): (+) Johnson et al. (2014): (+) Saha et al. (2013): (+) More et al. (2012): (0) Manandhar et al. (2004): (+)

Outcome/area	Key evaluation findings	Interpretation/implications for future programs	Comparison with existing evidence*
-	*Well-child care and use of Village Health Sanitation and Nutrition Days:* No impact was seen on immunization or on use of Village Health Sanitation and Nutrition Days for either the index or youngest children. Overall levels of immunization were high for youngest children, but only about 60 percent of these children were taken to Village Health Sanitation and Nutrition Days. The proportion of index children participating in Village Health Sanitation and Nutrition Day was even lower, at only 11 percent	The low use of the Village Health Sanitation and Nutrition Day platform is of concern and could reflect limited implementation of the Village Health Sanitation and Nutrition Day in these areas	
-	*Sick child care:* Low levels of key practices (ORS during diarrhea, zinc with ORS) and of use of Village Health Sanitation and Nutrition Day were observed among index children at baseline. Significantly higher likelihood of providing ORS during diarrhea for the youngest and index child in the treatment arm. No impact on zinc provision, which continued to be very low in both arms. Overall, fewer than one-half of children (index or youngest) receive either ORS or zinc.	The low use of ORS itself is a concern and potentially an area for future engagement of the SHG platforms. This is an easy behavior to alter.	

Outcome/area	Key evaluation findings	Interpretation/implications for future programs	Comparison with existing evidence*
- Hygiene and sanitation practices	No impact except for a very small impact on handwashing (3 pp). Overall, use of appropriate handwashing materials and having improved water source were high, but other practices were low, and both were similar in treatment and control groups at endline	There is much room for improvement in practices related to stool disposal and treatment of water to make it safe to drink. These are clear topics for additional community engagement	Saha et al. (2015): (+) Miller et al. (2014): (+)
- IYCF practices (youngest child)	No impact on most core IYCF indicators, but there is a positive and significant impact on timely introduction of complementary foods for children and continued breastfeeding at age two years, and a trend (non-significant) towards a greater proportion achieving minimum dietary diversity	Further efforts will be needed to invest in improvement of dietary diversity and consumption of iron-rich foods in this setting. Families are *not* vegetarian for the most part, suggesting that efforts to encourage animal-sourced foods can be safely undertaken	This study, like other studies, finds mixed impacts on IYCF practices whereby the interventions are successfully affecting some of the IYCF practices but not the others. Nair et al. (2017): Exclusive breastfeeding and timely introduction of complementary foods (0) Acharya et al. (2015): Colostrum feeding, early initiation of breastfeeding and exclusive breastfeeding for the first week.(+) Younes et al. (2015): Exclusive breast feeding for at least 6 months and mean duration of breast feeding (+) Saha et al. (2015): Colostrum feeding (+) Johnson et al. (2014): Early initiation of breastfeeding and complementary feeding at 6 months (+) Prennushi and Gupta (2014): Exclusive breastfeeding (0) Fottrell et al. (2013): Early initiation of breastfeeding within 1 hour and

Outcome/area	Key evaluation findings	Interpretation/implications for future programs	Comparison with existing evidence*
			exclusive breastfeeding for at least 6 weeks (+) Roy et al. (2013): Exclusive breastfeeding for first 6 weeks (+) Saha et al. (2013): Colostrum feeding (+) More et al. (2012): Early and exclusive breastfeeding (0) Bhutta et al. (2011): Colostrum feeding and early initiation of breastfeeding (+) Azad et al. (2010): Exclusive breastfeeding for the first 6 weeks (0) Kumar et al. (2008): Early initiation of breastfeeding (+)
- Child anthropometry	*Index child:* No impact on wasting or underweight prevalence, or on anthropometric scores among index children. Continued deterioration in height-for-age among children as they grew older. There is a marginal but significant increase in the prevalence of stunting.	Findings are consistent with other studies in poor settings that included only BCCs. Improvements in child undernutrition in such settings could require additional accompanying interventions such as food or cash assistance. Challenges with Integrated Child Development Scheme use and quality of food supplements in this context imply these were not adequate.	The evidence on the relationship between women's group-based interventions and anthropometric outcomes is mixed. Saville et al. (2018): WAZ, LAZ, WLZ, head circumference (0) Nair et al. (2017): Stunting, Wasting, MUAC (0) and underweight (-) Malapit et al. (2015): HAZ, WHZ and WAZ (0) Miller et al. (2014): HAZ (+) Jalal and Frongillo (2013): WHZ (+) De and Sarker (2011): WAZ (0) Kumar and Quisumbing (2011): Stunting (-) Galab et al. (2006): HAZ (0)
	Youngest child: No impact. Levels of undernutrition are marginally lower	Same as above.	

Outcome/area	Key evaluation findings	Interpretation/implications for future programs	Comparison with existing evidence*
	in the treatment groups but not large or significant.		
- Child morbidity	*Index child:* No impact on most indicators. However, a marginal increase in likelihood of child suffering from diarrhea is seen in a fully specified model. Very high levels of illness, especially cough and fevers.	Child morbidity is very high, especially of fevers and coughs (> 70 percent in the two weeks preceding the survey). These findings are not anomalous and concur with those of other childhood illness studies in Bihar (Emory University, personal communication)	The evidence on the relationship between women's group-based interventions and morbidity for children is mixed. Saville et al. (2018): (0) Nair et al. (2017): (0) Younes et al. (2015): (-) Miller et al. (2014): (0)
	Youngest child: No impact. However, a marginal increase in likelihood of child suffering from fever is seen significant in a fully specified model at only 10 percent. Similarly, high levels of illness also among younger infants.	Same as above.	
- Household food security	No impact on household food security experiences, despite a small improvement over time in both groups. Household food insecurity is high (> 50 percent anxious/uncertain around food and > 70 percent experienced insufficient food quality)	This finding suggests that financial or other resource constraints related to food availability and quality are deep concerns in this population. Achieving greater impacts on diet quality will require complementary approaches to improve basic food security as well	
- Awareness and use of government programs	No impact on awareness of schemes related to maternal and child nutrition (Janani Suraksha Yojana, Janani Shishu Suraksha Karyakram, Pradhan Mantri Matritva Suraksha Yojana), on knowledge of their	Awareness was high for Janani Suraksha Yojana but lower for Janani Shishu Suraksha Karyakram and very low for Pradhan Mantri Matritva Suraksha Yojana. This indicates that strengthening community awareness of	Prennushi and Gupta (2014): (+)

Outcome/area	Key evaluation findings	Interpretation/implications for future programs	Comparison with existing evidence*
	benefits or on the receipt of services from these schemes	key schemes is a key area for further work in strengthening uptake	
	Use of Integrated Child Development Scheme services at the Anganwadi Center: We find high awareness about the Integrated Child Development Scheme services at the Anganwadi Centers, but no differences between the arms. Only one-half of the children were enrolled at the centers. Among women who reported the presence of Anganwadi Center in the village, approximately 43 percent received food supplements during pregnancy and about 31 percent during early childhood	The Integrated Child Development Scheme in Bihar is known to have several challenges in achieving adequate reach, coverage, and quality of programs, and the outcomes of these are also seen in our study. It is likely that improving Integrated Child Development Scheme *and* using the group-based platform for awareness raising about the program services and entitlements could improve overall use and uptake of services	
Use of base JEEViKA SHG platform, including savings and loans	No difference between groups. Group saturation is high, overall, with 73 percent of women members of SHGs. Of these, 90 percent of SHGs have savings and credit activities. About 64 percent of the women reported that they or someone in their household had taken a loan from the SHG	This is a strength for the interpretation of impacts of the pilot, as it implies that the basic core JEEViKA services and coverage in both areas was not neglected as a result of pilot-related interventions.	
Core JEEViKA funds: Health Risk Fund	Women in the treatment arm were more likely to have heard of the Health Risk Fund, but less likely to have taken a loan. Overall, about 51 percent of the women were aware of this fund	Low loan-taking could indicate better health status overall. This is a core JEEViKA fund, so there is scope to improve awareness.	

Outcome/area	Key evaluation findings	Interpretation/implications for future programs	Comparison with existing evidence*
Core JEEViKA funds: Food Security Fund	Of women in the treatment arm, 73 percent were aware of the Food Security Fund, compared to only 59 percent of comparison arm women. A significantly higher proportion of treatment arm women availed themselves of the Food Security Fund to purchase food	Awareness and use of the Food Security Fund is much better in the treatment arm. Overall awareness could be improved. No information on the bundle of foods being purchased; since the platform is functioning, there is scope to use it to improve diversity of foods and food security in general	
Kitchen gardens	A large proportion of women report ever having a kitchen garden. This is higher in the treatment arm. The treatment arm women are also more likely to have received information on a range of cultivation practices. However, 36 percent of treatment arm women have not received any information about the garden.	Resources (including time) do not appear to be a serious constraint to the planting and maintenance of kitchen gardens, but the provision of information regarding cultivation needs to be improved.	
Exposure to pilot-specific nutrition content via the SHG platform	Greater in treatment areas, as expected. There was a 23 pp impact on seeing nutrition videos in the last year, a 15 pp increase in visits by nutrition cadre, a 6 pp increase in the likelihood of JEEViKA community events being held in their panchayats, and a 4 pp increase in the likelihood that they received health/nutrition services at these community events. Women in the treatment arm were consistently more likely to hear nutrition messages in the SHG, relative to the comparison arm	Suggests the intervention was effective at integrating nutrition-related content into the ongoing SHG meetings. Pilot-specific activities—e.g., community events, DG videos—also appear to have been implemented	

Outcome/area	Key evaluation findings	Interpretation/implications for future programs	Comparison with existing evidence*
Exposure, trial and adoption of nutrition messages	A few messages—hand wash practices, washing vegetables before cutting, and exclusive breastfeeding—were heard by more than 70 percent of the women. Other messages were less prevalent. Conditional on hearing a message, the proportion who ever tried the practice and the proportion who adopted the practice is very high.	Provision of information would appear to be the major barrier, since most women who hear a nutrition-related message adopt it.	

** (0) implies no impact/association, (+) implies a significant positive impact/association and (-) implies a significant negative impact/association of the intervention on the concerned nutrition outcome(s). Refer to Appendix G for detailed information on the study and intervention type.; HAZ – height-for-age z score; LAZ - length for age z-score; WAZ – weight-for-age z score; WHZ – weight-for-height z score; WLZ - weight-for-length z score.*

Full details of the literature review conducted are available in Appendix G.

References

Acharya, A., Lalwani, T., Dutta, R., Rajaratnam, J.K., Ruducha, J., Varkey, L.C., Wunnava,S., Menezes, L., Taylor, C., Bernson, J., 2015. Evaluating a large-scale community based intervention to improve pregnancy and newborn health among the rural poor in India. Am. J. Public Health 105, 144–152. http://dx.doi.org/10.2105/AJPH.2014.302092.

Ahmed, A., Hoddinott, J.F., Roy, S., Sraboni, E., Quabili, W. and Margolies, A., 2016. Which kinds of social safety net transfers work best for the ultra poor in Bangladesh. Operation and Impacts of the Transfer Modality Research Initiative. Dhaka: International Food Policy Research Institute and World Food Programme.

Azad, K., Barnett, S., Banerjee, B., Shaha, S., Khan, K., Rego, A.R., Barua, S., Flatman, D., Pagel, C., Prost, A., Ellis, M., Costello, A., 2010. Effect of scaling up women's groups on birth outcomes in three rural districts in Bangladesh: a cluster-randomised controlled trial. Lancet 375, 1193–1202. http://dx.doi.org/10.1016/S0140-6736(10)60142-0.

Bhutta, Z.A., Soofi, S., Cousens, S., Mohammad, S., Memon, Z.A., Ali, I., Feroze, A., Raza, F., Khan, A., Wall, S., Martines, J., 2011. Improvement of perinatal and newborn care in rural Pakistan through community-based strategies: a cluster-randomised effectiveness trial. Lancet 377, 403–412. http://dx.doi.org/10.1016/S0140-6736(10)62274-X.

Brody, C., De Hoop, T., Vojtkova, M., Warnock, R., Dunbar, M., Murthy, P., and Dworkin, S. L. (2015). Economic Self-Help group Programs for Improving Women's Empowerment: A Systematic Review. *Campbell Systematic Reviews* 19, 182. http://doi.org/10.4073/csr.2015.19

Cogill, B. (2003). Anthropometric Indicators Measurement Guide. Retrieved from http://www.fantaproject.org/sites/default/files/resources/anthropometry-2003-ENG.pdf

de Brauw, Alan, and Harigaya, Tomoko. 2007. Seasonal Migration and Living Standards in Vietnam. *American Journal of Agricultural Economics* 89 (2): 430-447.

De, S., Sarker, D., 2011. Women's empowerment through self-help groups and its impact on health issues: empirical evidence. J. Glob. Anal. 2, 51–73.

Edejer, T.T.T., Aikins, M., Black, R., Wolfson, L., Hutubessy, R. and Evans, D.B., 2005. Cost effectiveness analysis of strategies for child health in developing countries. Bmj, 331(7526), p.1177.

Fiedler, J. L., C. A. Villalobos, and A. C. de Mattos. 2008. "An Activity-Based Cost Analysis of the Honduras Community-Based, Integrated Child Care (AIN-C) Programme." *Health Policy and Planning* 23 (6): 408–427. doi:10.1093/heapol/czn018.

Fottrell, E., Azad, K., Kuddus, A., Younes, L., Shaha, S., Nahar, T., Aumon, B.H., Hossen, M., Beard, J., Hossain, T., Pulkki-Brannstrom, A.-M., Skordis-Worrall, J., Prost, A., Costello, A., Houweling, T.a.J., 2013. The effect of increased coverage of participatory women's groups on neonatal mortality in Bangladesh: a cluster randomized trial. JAMA Pediatr. 167, 816–825. http://dx.doi.org/10.1001/jamapediatrics.2013.2534.

Galab, S., Antony, P., Wilson, I., Jones, N., McCoy, A., Raju, S.R.R., Reddy, P.P., 2006. Exploring linkages between maternal social capital and children' s nutritional status in Andhra Pradesh (No. 32).

Habib, M., Jubb, C., 2015. Poverty alleviation with microfinance: Bangladesh evidence. policies reduct. Polic. Pract. Dev. Asia 11–30.

Harris-Fry, H.A., Azad, K., Younes, L., Kuddus, A., Shaha, S., Nahar, T., Hossen, M., Costello, A., Fottrell, E., 2016. Formative evaluation of a participatory women's group intervention to

improve reproductive and women's health outcomes in rural Bangladesh: a controlled before and after study. J. Epidemiol. Community Health 70, 663–670. http://dx.doi.org/10.1136/jech-2015-205855.

Harris-Fry, H.A., Paudel, P., Harrisson, T., Shrestha, N., Jha, S., Beard, B.J., Copas, A., Shrestha, B.P., Manandhar, D.S., Costello, A.M.D.L. and Cortina-Borja, M., 2018. Participatory women's groups with cash transfers can increase dietary diversity and micronutrient adequacy during pregnancy, whereas women's groups with food transfers can increase equity in intrahousehold energy allocation. The Journal of nutrition, 148(9), pp.1472-1483. https://doi.org/10.1093/jn/nxy109

Headey, D., K. Hirvonen and J. Hoddinott, 2018. Animal sourced food and child stunting. American Journal of Agricultural Economics, Vol 100, Issue 5 pp. 1302-1319

Horton, S. 1992. Unit costs, cost-effectiveness, and financing of nutrition interventions. Working papers, WPS 952, Population, Health and Nutrition, The World Bank

Jalal, C.S., Frongillo, E.A., 2013. Effect of poverty reduction program on nutritional status of the extreme poor in Bangladesh. Food Nutr. Bull. 34, 402–411.

Johnson, A., Butchereit, C., Keyes, M., Vance, D., Anderson, K., Gray, B., Metcalfe, M., Gash, M., Crookston, B., 2014. Longitudinal Study of the Impact of the Integration of Microfinance and Health Services on Bandhan Clients in India.

Kaplan, R. S., and S. R. Anderson. 2004. "Time-Driven Activity-Based Costing." *Harvard Business Review* 82 (11): 131–140.

Kumar, N., Quisumbing, A.R., 2011. Access, adoption, and diffusion: understanding the long-term impacts of improved vegetable and fish technologies in Bangladesh. J. Dev. Eff. 3, 193–219. http://dx.doi.org/10.1080/19439342.2011.570452.

Kumar. N, Raghunathan. K, and Menon. P. (2017). An Impact Evaluation of the JEEViKA Multisectoral Convergence Pilot in Bihar. SIEF Baseline Validation Report. Unpublished Baseline Report. International Food Policy Research Institute, Washington, DC.

Kumar, N., Scott, S., Menon, P., Kannan, S., Cunningham, K., Tyagi, P., Wable, G., Raghunathan, K., and Quisumbing, Agnes. (2018). Pathways from Women's Groups-based Programs to Nutrition Change in South Asia: A Conceptual Framework and Literature Review. *Global Food Security* 17: 172-185.

Kumar, V., Mohanty, S., Kumar, A., 2008. Effect of community-based behaviour change management on neonatal mortality in Shivgarh, Uttar Pradesh, India: a cluster-randomised controlled trial. Lancet 1151–1162.

Malapit, H.J.L., Kadiyala, S., Quisumbing, A.R., Cunningham, K., Tyagi, P., 2015. Women's empowerment mitigates the negative effects of low production diversity on maternal and child nutrition in Nepal. J. Dev. Stud. 51, 1097–1123. http://dx.doi.org/10.1080/00220388.2015.1018904.

Manandhar, D.S., Osrin, D., Shrestha, B.P., Mesko, N., 2004. Effect of a participatory intervention with women's group on birth outcomes in Nepal: cluster randomized controlled trial. Lancet 364, 970–979.

Miller, L.C., Joshi, N., Lohani, M., Rogers, B., Loraditch, M., Houser, R., Singh, P., Mahato, S., 2014. Community development and livestock promotion in rural Nepal: effects on child growth and health. Food Nutr. Bull. 35, 312–326. http://dx.doi.org/10.1177/156482651403500304.

More, N.S., Bapat, U., Das, S., Alcock, G., Patil, S., Porel, M., Vaidya, L., Fernandez, A., Joshi, W., Osrin, D., 2012. Community mobilization in Mumbai slums to improve perinatal care and

outcomes: a cluster randomized controlled trial. PLoS Med. 9. http://dx.doi.org/10.1371/journal.pmed.1001257.

Nair, N., Tripathy, P., Sachdev, H.S., Pradhan, H., Bhattacharyya, S., Gope, R., Gagrai, S., Rath, S., Rath, S., Sinha, R., Roy, S.S., Shewale, S., Singh, V., Srivastava, A., Costello, A., Copas, A., Skordis-Worrall, J., Haghparast-Bidgoli, H., Saville, N., Prost, A., 2017. Effect of participatory women's groups and counselling through home visits on children's linear growth in rural eastern India (CARING trial): a cluster-randomised controlled trial. Lancet Glob. Health 5, e1004–e1016. http://dx.doi.org/10.1016/S2214-109X(17)30339-X.

Prennushi, G., Gupta, A., 2014. Women's empowerment and socio-economic outcomes: impacts of the Andhra Pradesh rural poverty reduction program. World Bank, Policy Res. Work. Pap. Ser. 6841, 2014.

Raghunathan, K., Chauhan, T., Avula, R., Chakrabarti. S, Kohli, N., Kumar, N., and Menon. P. (2017a). October. An Impact Evaluation of the JEEViKA Multisectoral Convergence Pilot in Bihar – A Process Evaluation Report. Unpublished Baseline Report. International Food Policy Research Institute, Washington, DC.

Raghunathan, K., Kumar, N., Chakrabarti, S., Chauhan, T., Varghese, V. R., and Menon, P. (2017b). April. An Impact Evaluation of the JEEViKA Multisectoral Convergence Pilot in Bihar. Unpublished Baseline Report. International Food Policy Research Institute, Washington, DC.

Roodman, D., Nielsen, M. Ø., MacKinnon, J. G., & Webb, M. D. (2019). Fast and wild: Bootstrap inference in Stata using boottest. The Stata Journal, 19(1), 4-60.

Roy, S.K., S.P. Jolly, S. Shafique, G. J. Fuchs, Z. Mahmud, B. Chakraborty and S. Roy. 2007. Prevention of malnutrition among children in rural Bangladesh by a food-health-care educational intervention: A randomized, controlled trial. Food and Nutrition Bulletin, vol. 28, no. 4, pp. 375-383

Roy, S.S., Mahapatra, R., Rath, S., Bajpai, A., Singh, V., Rath, S., Nair, N., Tripathy, P., Gope, R.K., Sinha, R., Costello, A., Pagel, C., Prost, A., 2013. Improved neonatal survival after participatory learning and action with women' s groups: a prospective study in rural eastern India. Bull. World Health Organ. 91, 426–433B. http://dx.doi.org/10.2471/BLT.12.105171.

Ruel, Marie T.; Quisumbing, Agnes R.; and Balagamwala, Mysbah. 2018. Nutrition-sensitive agriculture: What have we learned so far? Global Food Security 17 (June 2018): 128-153. https://doi.org/10.1016/j.gfs.2018.01.002

Saha, S., Annear, P. L., and Pathak, S. (2013). The Effect of Self-Help Groups on Access to Maternal Health Services: Evidence from Rural India. *International Journal for Equity in Health* 12 (36): 1–9.

Saha, S., Kermode, M., Annear, P.L., 2015. Effect of combining a health program with a microfinance-based self-help group on health behaviors and outcomes. Public Health 129, 1510–1518. http://dx.doi.org/10.1016/j.puhe.2015.07.010.

Saville, N.M., Shrestha, B.P., Style, S., Harris-Fry, H., Beard, B.J., Sen, A., Jha, S., Rai, A., Paudel, V., Sah, R. and Paudel, P., 2018. Impact on birth weight and child growth of Participatory Learning and Action women's groups with and without transfers of food or cash during pregnancy: Findings of the low birth weight South Asia cluster-randomised controlled trial (LBWSAT) in Nepal. PloS one, 13(5), p.e 0194064. https://doi.org/10.1371/journal.pone.0194064

Shariff, A., 2015. District Development and Diversity Index: Report for India and Major States. Washington DC: US-Indian Policy Institute.

Tan-Torres Edejer, T., R. Baltussen, T. Adam, R. Hutubessy, A. Acharya, D. B. Evans, and C. J. L. Murray. 2003. Making Choices in Health: WHO Guide to Cost-Effectiveness Analysis. Geneva: World Health Organization.

Waters, H.R., Penny, M.E., Creed-Kanashiro, H.M., Robert, R.C., Narro, R., Willis, J., Caulfield, L.E. and Black, R.E., 2006. The cost-effectiveness of a child nutrition education programme in Peru. Health Policy and Planning, 21(4), pp.257-264.

WHO (World Health Organization). (2006). WHO Child Growth Standards: Length/height-for-age, weight-for-age, weight-for-length, weight-for-height and body mass index-for-age. Methods and Development.

Wooldridge, J. M. (2002). Econometric analysis of cross section and panel data (No. 330.18/W91e).

Younes, L., Houweling, T.A.J., Azad, K., Kuddus, A., Shaha, S., Haq, B., Nahar, T., Hossen, M., Beard, J., Copas, A., Prost, A., Costello, A., Fottrell, E., 2015. The effect of participatory women's groups on infant feeding and child health knowledge, behaviour and outcomes in rural Bangladesh: a controlled before-and-after study. J. Epidemiol. Community Health 69, 374–381. http://dx.doi.org/10.1136/jech-2014-204271.

Appendix

A. Attrition

Enumerators were generally successful in resurveying respondent women from the baseline households. In total, 2,119 of the 2,246 respondent women that were included in the baseline survey were resurveyed at endline, representing an attrition rate of 5.65 percent over the 30-month period (Table 4.1). Although the overall attrition rate is reasonably low, one might be concerned that the respondent women that could not be found were different in specific ways from the households that were found, and if so, that the impact results may be biased. To allay these fears, we conduct attrition analysis for the respondent woman sample. Since some of the primary outcomes are defined at the index child level, we also present attrition analysis for the index child sample. The attrition among index children is 16.25 percent over the 30-month period. In the text that follows we analyze the characteristics of the dropout respondent women and index children relative to those who were located for the endline survey.

A.1 Endline sample and attrition

We find slight differences in the attrition rates across the two intervention groups (Table A.1).[21] Respondent women in the control group were slightly less likely to attrit (5.5 percent) than respondent women in the treatment group (5.8 percent), but these differences were not statistically significant. A similar pattern of attrition among the index children was observed, with the index children more likely to be found in the control group as compared to the treatment group.

Table A.1 Attrition by treatment status

Panel A: Respondent women	**Treatment**	**Control**
Baseline	1,164	1,082
Endline	1,096	1,023
Percent Found, Endline	94.2	94.5
Panel B: Index children	**Treatment**	**Control**
Baseline	1,164	1,082
Endline	971	910
Percent Found, Endline	83.4	84.1

Source: Authors' calculations.

We also observed some differences in attrition rates by block (Table A.2). In Saur Bazaar and Sonbarsa Raj the attrition rate at the respondent woman level was 5.7 and 7.9 percent, respectively, whereas it was only 2.4 percent in Pattarghat. The difference in attrition among index children follows the same pattern as for respondent women, with attrition rates highest in Sonbarsa Raj and lowest in Pattarghat.

[21] These attrition rates are based on attrition rates as measured by whether the index child was found at the time of endline. This also takes into account missing data on anthropometric measures or date of birth at endline.

Table A.2 Attrition by block

Panel A: Respondent women	**Overall**	**Pattarghat**	**Saur Bazaar**	**Sonbarsa Raj**
Baseline	2,246	411	1,240	595
Endline	2,119	401	1,170	548
Percent Found, Endline	94.3	97.6	94.3	92.1
Panel B: Index children	**Overall**	**Pattarghat**	**Saur Bazaar**	**Sonbarsa Raj**
Baseline	2,246	411	1,240	595
Endline	1881	352	1,039	549
Percent Found, Endline	83.7	85.6	83.8	82.3

Although low attrition rates rarely affect estimation results in the literature (e.g., de Brauw and Harigaya 2007), it is still worth ensuring that impact estimates are not going to be biased by nonrandom attrition. We approach this from two perspectives. First, we examine baseline descriptive statistics on respondent women by endline attrition status. Next, we estimate a probit model for whether respondent women were found, based on characteristics that looked like they might be important from the descriptive statistics.

We first examine several measures of demographics, wealth and dwelling characteristics, and household activities in the baseline survey, by whether respondent women were found in the final survey (Table A.3). We do this for the sample as a whole as differences in attrition by treatment and comparison arms were small and insignificant. We perform a test of equality of means for each of these variables across the panel and lost respondent women. We find that the primary differences exist in demographic characteristics. For example, households with greater number of females in the age ranges of 16–30 and 31–54 years old are more likely to leave the sample whereas those with fewer females in the age range of 5–15 years were more likely to stay. A few additional variables are of significance; for example, whether the flooring of the dwelling was made of improved materials, whether the household used dung as the primary source of cooking fuel, the level of schooling within the household and whether the household belonged to the general caste category. The respondent woman's characteristics were significantly different between those that were re-interviewed as compared to those that were not. However, many of the other variables are not significant, which suggests that at least the amount of selection occurring on observable variables is quite small.

Table A.3 Descriptive statistics, select baseline characteristics, by whether household was resurveyed at endline

Variables	Baseline Average	Panel Households	Non-Panel Households	p-value, test of equality of means
Religion of household head				
Hindu	0.90	0.90	0.87	0.32
Muslim	0.10	0.09	0.13	0.30
Caste of household head				
Scheduled caste	0.36	0.36	0.36	0.99
Scheduled tribe	0.02	0.02	0.02	0.55
Other backward castes	0.57	0.57	0.51	0.19
General	0.04	0.04	0.09	0.08
Demographic characteristics				
Household size	6.64	6.64	6.65	0.95
No. of male members 0–4 years old	0.91	0.91	0.91	0.99
No. of male members 5–15 years old	0.57	0.57	0.51	0.42
No. of male members 16–30 years old	0.81	0.81	0.88	0.36
No. of male members 31–54 years old	0.47	0.47	0.41	0.20
No. of male members <= 55 years old	0.28	0.29	0.23	0.14
No. of female members 0–4 years old	0.97	0.97	0.99	0.80
No. of female members 5–15 years old	0.83	0.84	0.66	0.04
No. of female members 16–30 years old	1.14	1.13	1.28	0.00
No. of female members 31–54 years old	0.43	0.43	0.53	0.04
No. of female members <= 55 years old	0.23	0.23	0.25	0.50
Education				
Highest number of years of schooling in HH	5.82	5.77	6.71	0.02
Highest number of years of schooling in HH, female	3.39	3.35	4.17	0.04
Highest number of years of schooling in HH, male	5.09	5.05	5.83	0.07
Socioeconomic characteristics				
Flooring of improved materials	0.14	0.13	0.20	0.07
Walls of improved materials	0.49	0.49	0.46	0.41
Roof of improved materials	0.38	0.38	0.40	0.56
Access to electricity	0.74	0.74	0.76	0.54
Main cooking fuel: Liquefied Petroleum Gas	0.05	0.05	0.09	0.11
Main cooking fuel: wood	0.82	0.82	0.83	0.74
Main cooking fuel: dung	0.12	0.12	0.06	0.01
Total number of assets owned (0, 25)	5.98	5.96	6.30	0.22
Any HH member has a bank account	0.89	0.89	0.89	0.97
Any HH female member has a bank account	0.84	0.84	0.86	0.56
Any HH male member has a bank account	0.58	0.58	0.55	0.47
Respondent woman's characteristics				
Age	25.39	25.49	23.88	0.00
Years of schooling	2.15	2.10	3.03	0.02
No. of children	2.71	2.74	2.26	0.00
% occupied in non-agricultural day labor	0.08	0.09	0.06	0.30
% occupied as housewives	0.73	0.73	0.80	0.05
% occupied in agricultural day labor	0.13	0.13	0.09	0.07
Index child's characteristics				

Variables	Baseline Average	Panel Households	Non-Panel Households	p-value, test of equality of means
Age	14.36	14.36	14.38	0.99
Sex: male	0.51	0.51	0.50	0.83

Source: Authors' calculations.

To follow the methodology described by Wooldridge (2002), we estimate a probit model in which the dependent variable takes a value of 1 if the household was found at the endline survey and 0 if it was not. We use baseline demographic and socioeconomic variables from Table A.3 for which the difference in means was significantly different and add treatment and block dummies as additional controls. In addition, we estimate probit models for attrition among the respondent women as well as the index children. We also present a fully interacted model which includes all covariates interacted with the treatment dummy, to confirm that the predictors of attrition are the same across the treatment and comparison groups. The results from these models are presented in Table A.4.

Table A.4 Probit model predicting households staying in the sample between baseline and endline surveys

	Base model		Fully interacted model	
Variables	(1) Respondent Woman	(2) Index Child	(3) Respondent Woman	(4) Index Child
Treatment area	0.009	-0.004	0.002	0.028
	(0.006)	(0.010)	(0.031)	(0.088)
Household caste is General	-0.034		-0.018	
	(0.033)		(0.033)	
No. of male members 5-15 years old		-0.001		0.003
		(0.005)		(0.006)
No. of female members 0-4 years old		-0.024***		-0.010
		(0.008)		(0.013)
No. of female members 5-15 years old	0.001	-0.004	0.004	-0.005
	(0.005)	(0.004)	(0.005)	(0.006)
No. of female members 16-30 years old	-0.010	0.018**	-0.017*	0.014
	(0.007)	(0.009)	(0.009)	(0.013)
No. of female members 31-54 years old	-0.012*	-0.003	-0.008	-0.003
	(0.007)	(0.006)	(0.011)	(0.006)
Highest number of years of schooling in HH	-0.003		0.000	
	(0.003)		(0.007)	
Highest number of years of schooling in HH, female	0.004		-0.000	
	(0.003)		(0.003)	

Highest number of years of schooling in HH, male	0.002		-0.001	
	(0.002)		(0.006)	
Index child's age		-0.005***		-0.005***
		(0.001)		(0.002)
Index child is male		-0.021		-0.019
		(0.013)		(0.021)
Respondent woman's age	0.004	0.002	0.004	0.002
	(0.002)	(0.002)	(0.002)	(0.003)
Respondent woman's years of schooling	-0.003		0.001	
	(0.003)		(0.003)	
Respondent woman's no. of children	0.000	0.004	0.000	0.002
	(0.006)	(0.008)	(0.007)	(0.010)
Respondent woman's occupation is housewife	0.001	-0.014	-0.009	0.000
	(0.011)	(0.014)	(0.013)	(0.013)
Respondent woman's occupation is agriculture day laborer	0.017	0.007	0.016	0.006
	(0.017)	(0.019)	(0.017)	(0.020)
Flooring of improved materials	-0.017		-0.017	
	(0.015)		(0.015)	
Main cooking fuel is liquified petroleum gas		-0.025		-0.044
		(0.028)		(0.048)
Main cooking fuel is dung	0.026***	0.011	0.017	0.017
	(0.010)	(0.015)	(0.016)	(0.018)
Saur Bazaar	-0.038***	0.006	-0.032**	0.016
	(0.010)	(0.010)	(0.013)	(0.014)
Sonbarsa Raj	-0.076***	0.007	-0.080***	-0.006
	(0.018)	(0.010)	(0.019)	(0.010)
Treated*Household caste is General			-0.019	
			(0.047)	
Treated*No. of male members 5-15 years old				-0.009
				(0.009)
Treated*No. of female members 0-4 years old				-0.022
				(0.016)
Treated*No. of female members 5-15 years old			-0.005	0.002
			(0.009)	(0.007)
Treated*No. of female members 16-30 years old			0.012	0.005
			(0.015)	(0.017)

Treated*No. of female members 31-54 years old			-0.010	
			(0.014)	
Treated*Highest number of years of schooling in HH			-0.007	
			(0.007)	
Treated*Highest number of years of schooling in HH, female			0.009*	
			(0.005)	
Treated*Highest number of years of schooling in HH, male			0.005	
			(0.006)	
Treated*Index child's age				-0.000
				(0.002)
Treated*Index child is male				0.002
				(0.025)
Treated*Respondent woman's age				0.000
				(0.004)
Treated*Respondent woman's years of schooling			-0.009	
			(0.006)	
Treated*Respondent woman's no. of children			0.001	0.003
			(0.007)	(0.014)
Treated*Respondent woman occupation's housewife			0.017	-0.032
			(0.016)	(0.026)
Treated*Main cooking fuel is Liquified Petroleum Gas				0.021
				(0.025)
Treated*Main cooking fuel is dung			0.023	-0.018
			(0.020)	(0.040)
Treated*Saur Bazaar			-0.017	-0.020
			(0.017)	(0.020)
Treated*Sonbarsa			0.000	0.020
			(0.015)	(0.015)
Observations	2,198	1,995	2,198	1,995

Source: Authors' calculations.
Legend: *p<0.10; **p<0.05; ***p<0.01; Standard errors in parentheses

For the respondent woman-level analysis, only four variables appear to have a significant relationship with the dependent variable, these are: number of female members in the age range 31–54 years, main cooking fuel is dung and the block dummies for Saur Bazar and Sonbarsa Raj. For the attrition at the index child level, there are three covariates that have a statistically significant coefficient: age of the index child,

number of female members 0–4 years old and number of female members 16–30 years old. We do not expect this to bias our impact estimates.

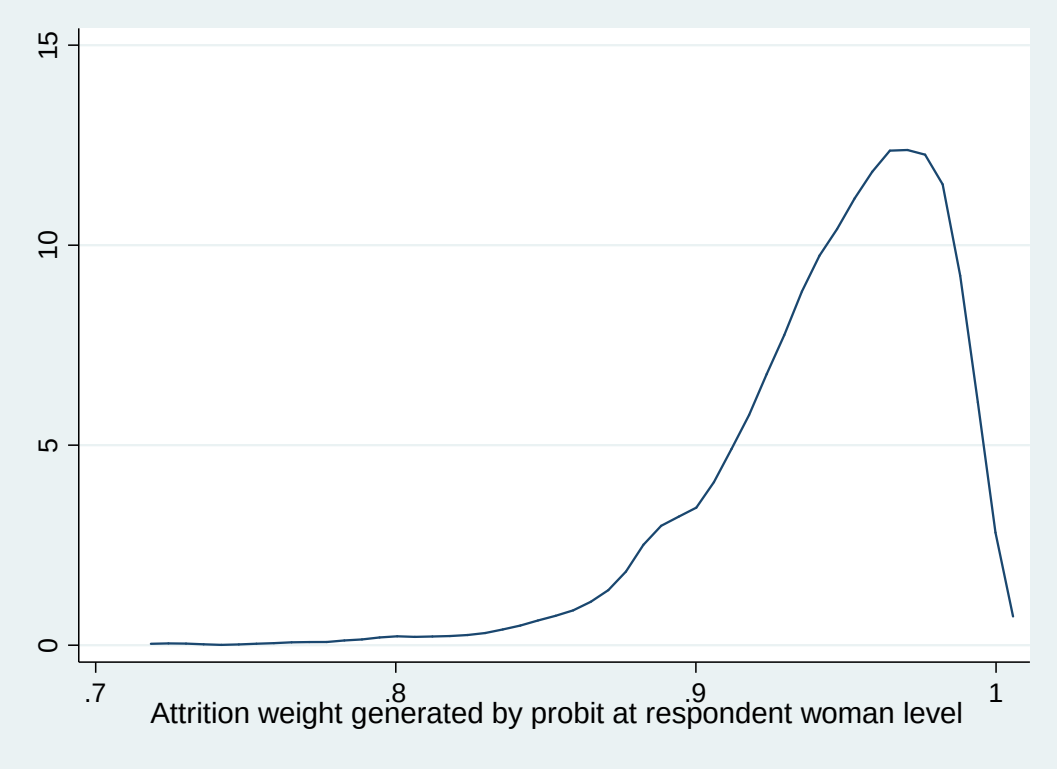

Figure A-1 Distribution of attrition weights at the household level

Although few variables were significantly related to the dummy variable for remaining households, the model does have some predictive power. Respondent women who remain in the sample have an average predicted probability of staying at 94.7 percent, while for the missing respondent women it is 92.1 percent. The median predicted probability of staying in the sample is slightly higher, at 95.3 percent. When we plot a kernel density of the attrition weights (Figure A-1), it is clear that most households will receive similar weights and only a few have probabilities of less than 85 percent, which corresponds to a weight of 1.17. In fact, the lowest predicted probability of staying in the sample is 0.725, so no respondent woman would receive a weight of larger than 1.38. As more than 94 percent of respondent women were found in the final survey, all of these findings about the attrition weights are reasonable. In addition, because the distribution of weights is tight, it is unlikely that results will change when we control for attrition.

B. List of outcome indicators, impact model and covariates

Table B.1 List of outcome indicators, impact model and list of covariates

Outcome indicator	Model	Covariates
Primary outcomes		
Women's BMI	ANCOVA-Base	Baseline women's BMI, treatment indicator and block dummies

Women's BMI	ANCOVA-Fully specified	Baseline women's BMI, treatment indicator, baseline covariates for female respondent's characteristics, household demographic and socioeconomic characteristics and block dummies*
Child reported dietary diversity (index child 6–23 months at baseline)	ANCOVA- Base	Baseline child reported dietary diversity, treatment indicator, child sex and child age and block dummies
Child reported dietary diversity (index child 6–23 months at baseline)	ANCOVA-Fully specified	Baseline child reported dietary diversity, treatment indicator, child sex and child age, baseline covariates for the index child, female respondent's characteristics, household demographic and socioeconomic characteristics and block dummies*
Secondary outcomes		
Women's reported dietary diversity	ANCOVA-Base	Baseline women's reported dietary diversity, treatment indicator and block dummies
Women's reported dietary diversity	ANCOVA-Fully specified	Baseline women's reported dietary diversity, treatment indicator, baseline covariates for female respondent's characteristics, household demographic and socioeconomic characteristics and block dummies*
Child anthropometric outcomes – HAZ, WAZ, WHZ, stunting, underweight, wasting (index child 6–23 months at baseline)	ANCOVA- Base	Corresponding baseline child anthropometric outcomes, treatment indicator, child sex, child age and block dummies
Child anthropometric outcomes – HAZ, WAZ, WHZ, stunting, underweight, wasting (index child 6–23 months at baseline)	ANCOVA-Fully specified	Corresponding baseline child anthropometric outcomes, treatment indicator, child sex, child age, baseline covariates for the index child, female respondent's characteristics, household demographic and socioeconomic characteristics and block dummies*
Maternal knowledge– scores on health knowledge, sanitation knowledge and nutrition knowledge	ANCOVA- Base and Fully specified models	Baseline score, treatment indicator, block dummies – **Base only** baseline covariates for female respondent's characteristics, household demographic and socioeconomic characteristics*
Health practices – scores on maternal and child health practices	ANCOVA- Base and Fully specified models	Baseline score, treatment indicator, block dummies, child sex and child age** – **Base only** baseline covariates for female respondent's characteristics, household

		demographic and socioeconomic characteristics*
Score of Sanitation practices – scores on household sanitation practices	ANCOVA- Base and Fully specified models	Baseline score, treatment indicator, block dummies, child sex and child age** – **Base only** baseline covariates for female respondent's characteristics, household demographic and socioeconomic characteristics*
Nutrition practice score – scores reflecting optimal nutrition practices	ANCOVA- Base and Fully specified models	Baseline score, treatment indicator, block dummies, child sex and child age** – **Base only** baseline covariates for female respondent's characteristics, household demographic and socioeconomic characteristics*
Household Food Security	ANCOVA- Base and Fully specified models	Baseline score, treatment indicator, block dummies – **Base only** baseline covariates for female respondent's characteristics, household demographic and socioeconomic characteristics*
Utilization of public entitlement schemes – such as Integrated Child Development Scheme, Janani Suraksha Yojana, Janani Shishu Suraksha Karyakram.	Single difference- Base and fully specified models	Baseline score, treatment indicator, block dummies, child sex and child age** – **Base only** baseline covariates for female respondent's characteristics, household demographic and socioeconomic characteristics*

Notes:
* This list of covariates includes all covariates that were unbalanced at baseline between the treatment and control groups. Other controls are additionally taken in fully specified models. Baseline covariates unbalanced at 10% include: household size, no. female HH members, HH head is General caste, HH has electricity, HH floor is made of improved material, respondent woman's husband is HH head, highest number of years of schooling in the HH (female) and dummy for respondent woman being an agricultural labourer. The full list of covariates includes: all those covariates unbalanced at 10%; in addition, number of assets owned by the HH, Caste of HH head, HH head is Muslim, 10 dummies for household demographic structure, any female HH member has bank account, respondent woman age, dummies for respondent woman being a non-agricultural day labourer or a housewife.
** Child sex and age (endline values) are used as additional control for all child-level outcome only

C. Balance of characteristics of households who have a youngest child, across treatment and comparison arms

Table C.1 Balance of socio-economic, demographic and other characteristics of the households who have a youngest child at endline, across treatment and comparison arms

	HHs with youngest child (N= 805)		HHs without youngest child (N= 1314)		
	Mean/ Proportion	**Standard Deviation**	**Mean/ Proportion**	**Standard Deviation**	**P-value**
HH Head Religion-Muslim	11.68	0.32	8.14	0.27	0.04**
HH Head caste-Scheduled caste	37.89	0.49	35.08	0.48	0.21
HH Head caste-Scheduled tribe	2.73	0.16	1.98	0.14	0.37
HH Head caste-Other backward caste	54.78	0.50	58.60	0.49	0.08*
Household size	6.47	2.56	6.74	2.55	0.02**
Assets (sum) out of total 25	5.94	2.70	5.97	2.64	0.74
No. males in age group 0 to 4 years	0.73	0.70	1.01	0.77	0.00***
No. males in age group 5 to 15 years	0.48	0.76	0.63	0.89	0.00***
No. males in age group 16 to 30 years	0.90	0.83	0.75	0.80	0.00***
No. males in age group 31 to 55 years	0.44	0.55	0.49	0.58	0.04**
No. males in age group 55 or more years	0.29	0.46	0.28	0.46	0.96
No. females in age group 0 to 4 years	1.07	0.78	0.91	0.79	0.00***
No. females in age group 5 to 15 years	0.71	0.95	0.91	1.09	0.00***
No. females in age group 16 to 30 years	1.19	0.57	1.10	0.62	0.01***
No. females in age group 31 to 55 years	0.43	0.51	0.43	0.53	0.76
No. females in age group 55 or more years	0.23	0.44	0.22	0.43	0.68
Any female HH member has bank account	84.35	0.36	83.71	0.37	0.77
Highest number of years of schooling in H, female	3.36	3.96	3.34	3.94	0.89
Respondent woman age	24.40	3.63	26.15	4.30	0.00***
Respondent woman's education	2.34	3.78	1.95	3.66	0.04**
Respondent woman's number of children	2.33	1.32	2.98	1.48	0.00***
Primary Occupation of Respondent woman: Non-Agriculture day labour	9.33	0.29	8.17	0.27	0.21
Primary Occupation of Respondent woman: House work/Housewife	72.14	0.45	73.59	0.44	0.28
Primary Occupation of Respondent woman: Agriculture day labour	13.06	0.34	13.51	0.34	0.74

House has electricity	74.16	0.44	73.90	0.44	0.89
House floor is made of improved material	12.30	0.33	13.70	0.34	0.29
Respondent woman's husband is head	43.35	0.50	49.92	0.50	0.01***

Source: Authors' calculations.
Legend: * p<0.10; ** p<0.05; *** p<0.01

D. Impact of the pilot correcting for social desirability

Table D.1 Impact of the JEEViKA-MC pilot on index child food group consumption, correcting for social desirability

	Index Child		
	Total number of food groups consumed in last 24 hours		
	(1)	(2)	(3)
Treatment dummy (= 1 if treatment Gram Panchayat)	0.201	0.172	0.177
	(0.078)	(0.079)	(0.082)
P-value cluster	0.017**	0.040**	0.042**
P-value bootstrap	0.044**	0.075*	0.082*
Comparison arm mean	2.398	2.398	2.398
Observations	1,881	1,878	1,878

Source: Authors' calculations.

Notes:

1. *p<0.10; **p<0.05; ***p<0.01
2. Standard errors in parentheses
3. Regression specification accounts for survey design (clustering at gram panchayat level), with block level fixed effects. Both clustered and wild bootstrapped p-values have been estimated for each specification.
4. The first column in each table reports the unadjusted base specification, i.e., the coefficient on the treatment indicator without controlling for any additional characteristics. Each subsequent column adds a set of covariates: column 2 adds those baseline covariates that were unbalanced at the 10 percent level, and column 3 controls for these baseline unbalanced characteristics as well as other relevant baseline characteristics.
5. Baseline covariates unbalanced at 10% include: household size, no. female HH members, HH head is General caste, HH has electricity, HH floor is made of improved material, respondent woman's husband is HH head, highest number of years of schooling in the HH (female) and dummy for respondent woman being an agricultural labourer. The full list of covariates includes: all those covariates unbalanced at 10%; in addition, number of assets owned by the HH, Caste of HH head, HH head is Muslim, 10 dummies for household demographic structure, any female HH member has bank account, respondent woman age, dummies for respondent woman being a non-agricultural day labourer or a housewife.
6. All columns control for baseline values of the outcome variable.
7. All columns additionally control for endline values of child's age and gender dummy.
8. Baseline comparison arm mean values are provided for comparison.

Table D.2 Impact of the JEEViKA-MC pilot on youngest child food group consumption, correcting for social desirability

	Youngest Child		
	Total number of food groups consumed in last 24 hours		
	(1)	(2)	(3)
Treatment dummy (= 1 if treatment Gram Panchayat)	0.293	0.261	0.285
	(0.117)	(0.121)	(0.119)
P-value cluster	0.020**	0.042**	0.025**
P-value bootstrap	0.050*	0.079*	0.057*
Comparison arm mean	3.411	3.411	3.411
Observations	805	804	804

Source: Authors' calculations.

Notes:

1. *p<0.10; **p<0.05; ***p<0.01
2. Standard errors in parentheses
3. Regression specification accounts for survey design (clustering at gram panchayat level), with block level fixed effects. Both clustered and wild bootstrapped p-values have been estimated for each specification.
4. The first column in each table reports the unadjusted base specification, i.e., the coefficient on the treatment indicator without controlling for any additional characteristics. Each subsequent column adds a set of covariates: column 2 adds those baseline covariates that were unbalanced at the 10 percent level, and column 3 controls for these baseline unbalanced characteristics as well as other relevant baseline characteristics.
5. Baseline covariates unbalanced at 10% include: household size, no. female HH members, HH head is General caste, HH has electricity, HH floor is made of improved material, respondent woman's husband is HH head, highest number of years of schooling in the HH (female) and dummy for respondent woman being an agricultural labourer. The full list of covariates includes: all those covariates unbalanced at 10%; in addition, number of assets owned by the HH, Caste of HH head, HH head is Muslim, 10 dummies for household demographic structure, any female HH member has bank account, respondent woman age, dummies for respondent woman being a non-agricultural day labourer or a housewife.
6. All columns additionally control for endline values of child's age and gender dummy.
7. Endline comparison arm mean values are provided for comparison.

Table D.3 Impact of the JEEViKA-MC pilot on youngest child minimum dietary diversity, correcting for social desirability

	Youngest Child		
	Child achieved minimum dietary diversity in last 24 hours		
	(1)	(2)	(3)
Treatment dummy (= 1 if treatment Gram Panchayat)	0.075	0.061	0.074
	(0.048)	(0.048)	(0.048)
P-value cluster	0.131	0.220	0.142
P-value bootstrap	0.175	0.255	0.190
Comparison arm mean	0.545	0.545	0.545
Observations	805	804	804

Source: Authors' calculations.

Notes:

1. *p<0.10; **p<0.05; ***p<0.01
2. Standard errors in parentheses
3. Regression specification accounts for survey design (clustering at gram panchayat level), with block level fixed effects. Both clustered and wild bootstrapped p-values have been estimated for each specification.
4. The first column in each table reports the unadjusted base specification, i.e., the coefficient on the treatment indicator without controlling for any additional characteristics. Each subsequent column adds a set of covariates: column 2 adds those baseline covariates that were unbalanced at the 10 percent level, and column 3 controls for these baseline unbalanced characteristics as well as other relevant baseline characteristics.
5. Baseline covariates unbalanced at 10% include: household size, no. female HH members, HH head is General caste, HH has electricity, HH floor is made of improved material, respondent woman's husband is HH head, highest number of years of schooling in the HH (female) and dummy for respondent woman being an agricultural labourer. The full list of covariates includes: all those covariates unbalanced at 10%; in addition, number of assets owned by the HH, Caste of HH head, HH head is Muslim, 10 dummies for household demographic structure, any female HH member has bank account, respondent woman age, dummies for respondent woman being a non-agricultural day labourer or a housewife.
6. All columns additionally control for endline values of child's age and gender dummy.
7. Endline comparison arm mean values are provided for comparison.

E. Results on key primary outcomes when restricted to SHG members

Table E.1 Impact of the JEEViKA-MC pilot on maternal BMI (restricted to SHG members)

	Respondent Woman		
	Body mass index		
	(1)	(2)	(3)
Treatment dummy (=1 if treatment Gram Panchayat)	0.052	0.034	0.040
	(0.101)	(0.095)	(0.096)
P-value cluster	0.611	0.725	0.679
P-value bootstrap	0.647	0.749	0.699
Comparison arm mean	19.052	19.052	19.052
Observations	1,545	1,540	1,540

Source: Authors' Calculation
Notes:
1. *p<0.10; **p<0.05; ***p<0.01
2. Standard errors in parentheses
3. Regression specification accounts for survey design (clustering at gram panchayat level), with block level fixed effects. Both clustered and wild bootstrapped p-values have been estimated for each specification.
4. The first column in each table reports the unadjusted base specification, i.e., the coefficient on the treatment indicator without controlling for any additional characteristics. Each subsequent column adds a set of covariates: column 2 adds those baseline covariates that were unbalanced at the 10 percent level, and column 3 controls for these baseline unbalanced characteristics as well as other relevant baseline characteristics.
5. Baseline covariates unbalanced at 10% include: household size, no. female HH members, HH head is General caste, HH has electricity, HH floor is made of improved material, respondent woman's husband is HH head, highest number of years of schooling in the HH (female) and dummy for respondent woman being an agricultural labourer. The full list of covariates includes: all those covariates unbalanced at 10%; in addition - number of assets owned by the HH, Caste of HH head, HH head is Muslim, 10 dummies for household demographic structure, any female HH member has bank account, respondent woman age, dummies for respondent woman being a non-agricultural day labourer or a housewife.
6. All columns control for baseline values of the outcome variable
7. Baseline comparison arm mean values are provided for comparison

Table E.2 Impact of the JEEViKA-MC pilot on the likelihood of the respondent woman being underweight (restricted to SHG members)

	Probability of being underweight		
	(1)	(2)	(3)
Treatment dummy (=1 if treatment Gram Panchayat)	-0.021	-0.023	-0.026
	(0.024)	(0.024)	(0.024)
P-value cluster	0.393	0.354	0.293
P-value bootstrap	0.425	0.379	0.317
Comparison arm mean	0.442	0.442	0.442
Observations	1,545	1,540	1,540

Source: Authors' Calculation
Notes:
1. *p<0.10; **p<0.05; ***p<0.01

2. Standard errors in parentheses
3. Regression specification accounts for survey design (clustering at gram panchayat level), with block level fixed effects. Both clustered and wild bootstrapped p-values have been estimated for each specification.
4. The first column in each table reports the unadjusted base specification, i.e., the coefficient on the treatment indicator without controlling for any additional characteristics. Each subsequent column adds a set of covariates: column 2 adds those baseline covariates that were unbalanced at the 10 percent level, and column 3 controls for these baseline unbalanced characteristics as well as other relevant baseline characteristics.
5. Baseline covariates unbalanced at 10% include: household size, no. female HH members, HH head is General caste, HH has electricity, HH floor is made of improved material, respondent woman's husband is HH head, highest number of years of schooling in the HH (female) and dummy for respondent woman being an agricultural labourer. The full list of covariates includes: all those covariates unbalanced at 10%; in addition - number of assets owned by the HH, Caste of HH head, HH head is Muslim, 10 dummies for household demographic structure, any female HH member has bank account, respondent woman age, dummies for respondent woman being a non-agricultural day labourer or a housewife.
6. All columns control for baseline values of the outcome variable
7. Baseline comparison arm mean values are provided for comparison

Table E.3 Impact of the JEEViKA-MC pilot on dietary diversity among index children (restricted to SHG members)

	Index Child		
	Total number of food groups consumed in last 24 hours		
	(1)	**(2)**	**(3)**
Treatment dummy (=1 if treatment Gram Panchayat)	0.211	0.182	0.173
	(0.092)	(0.093)	(0.096)
P-value cluster	0.031**	0.063*	0.086*
P-value bootstrap	0.062*	0.111	0.138
Comparison arm mean	2.438	2.438	2.438
Observations	1,459	1,455	1,455

Source: Authors' Calculation
Notes:
1. *p<0.10; **p<0.05; ***p<0.01
2. Standard errors in parentheses
3. Regression specification accounts for survey design (clustering at gram panchayat level), with block level fixed effects. Both clustered and wild bootstrapped p-values have been estimated for each specification.
4. The first column in each table reports the unadjusted base specification, i.e., the coefficient on the treatment indicator without controlling for any additional characteristics. Each subsequent column adds a set of covariates: column 2 adds those baseline covariates that were unbalanced at the 10 percent level, and column 3 controls for these baseline unbalanced characteristics as well as other relevant baseline characteristics.
5. Baseline covariates unbalanced at 10% include: household size, no. female HH members, HH head is General caste, HH has electricity, HH floor is made of improved material, respondent woman's husband is HH head, highest number of years of schooling in the HH (female) and dummy for respondent woman being an agricultural labourer. The full list of covariates includes: all those covariates unbalanced at 10%; in addition - number of assets owned by the HH, Caste of HH head, HH head is Muslim, 10 dummies for household demographic structure, any female HH member has bank account, respondent woman age, dummies for respondent woman being a non-agricultural day labourer or a housewife.
6. All columns control for baseline values of the outcome variable
7. All columns additionally control for endline values of child's age and gender dummy
8. Baseline comparison arm mean values are provided for comparison

F. Knowledge module

The knowledge module administered to the household is copied here for reference.

SECTION J: HYGIENE, SANITATION, AND CLEANLINESS **खंड J: स्वास्थ्य, स्वच्छता और सफाई** I would now like to ask you some questions about hygiene and cleanliness. अब मैं आपसे कुछ सवाल स्वच्छता और साफ-सफाई के बारे में करना चाहूंगा/गी।		
J.01	How should one dispose of a young child's stools? छोटे बच्चों के पाखानों का निपटान कैसे किया जाना चाहिए? Instruction: if respondent says they threw the stool far away it is to be marked as 'left in the open'. निर्देश: अगर उत्तरदाता कहते हैं दूर जाके फेक दिया तो 'खुले में छोड़ दिया' को चुनने.	Flush down toilet/latrine शौचालय में बहाकर …….1 Rinse into drain/ditch नालियों/खाइ यों मेंघो कर …….. 2 Bury गाड़ कर ..... 3 Leave in the open खुले में छोड़कर..... 4 Other (specify) अन्य (उल्लेख करें) ..... -88 Don't know नहीं मालूम .....-99
J.02	What are some of the effects of open defecation on your environment? खुले में शौच करने से आपके पर्यावरण पर क्या-क्या प्रभाव होते हैं? *(Multiple responses possible, do not prompt, but please probe)* *(एक से अधिक उत्तर संभव हैं/उत्तर देने में सहायता नहीं करें लेकिन पूछताछ करें।)*	It can pollute the water source इससे जल-स्रोत प्रदूषित हो सकते हैं …… 1 It can spread diseases like diarrhea, typhoid etc. इससे डायरिया/दस्त/ मूह-पेट चलना , टायफायड जैसे रोग फैल सकते हैं …… 2 It makes the surroundings dirty and unpleasant to live in इससे आस पास का वातावरण गंदा हो जाता है और रहने लायक नहीं रह जाता है …… 3 Other (specify) अन्य (उल्लेख करें) …… -88 Don't know नहीं मालूम …… -99
J.03	What are the benefits of constructing a toilet? शौचालय बनाने की क्या-क्या- फायेदे हैं? *(Multiple responses possible)* *(एक से अधिक उत्तर संभव है)*	Reduce risk of infection from defecating in the open खुले में शौच करने से संक्रमण का खतरा कम करें ……...1 Makes household less susceptible to jaundice, typhoid and diarrhea घर को पीलिया, टाइफाइड और डायरिया/दस्त/ मूह-पेट चलना से कम संवेदी बना देता है …….2 Reduce pollution of common water sources आम पानी के स्रोतों के प्रदूषण को कम करें ……..…..3 Convenience and security of women महिलाओं की सुविधा और सुरक्षा ……..4 Improve the village's image गांव की छवि में सुधार ……..5 Other (specify) अन्य (उल्लेख करें) …… -88

		Don't know नहीं मालूम …… -99
J.04	What are the ways to make drinking water safe? पीने के पानी को साफ़ बनाने के क्या तरीके हैं? *(Multiple response-possible. Do not prompt.)* *(एक से अधिक जवाब दिये जा सकते है। जवाब देने में सहायता न करें।)*	Let it stand and settle/sedimentation खड़ा होने दें/ सेडिमेंटेशन होने दें …….. 1 Strain it through cloth कपड़ा से छानें …….. 2 Boil it इसे उबालें …… 3 Add bleach/chlorine ब्लीच/क्लोरीन डालें …… 4 Use a water filter (ceramic, sand, and composite) एक पानी के फिल्टर चीनी) मिट्टी, रेत, और मिश्रणका (प्रयोग करें ……. 5 Solar disinfection (Sodis method) सौर कीटाणुशोधन) SODIS विधि(…….. 6 Use electronic purifier इलेक्ट्रॉनिक शोधक का उपयोग करें ……...7 Other (Specify) _____ अन्य (निर्दिष्ट करें) _____ -88 Don't know नहीं मालूम …… -99
J.05	How should one store purified drinking water? शुद्ध किए हुए पानी को कैसे रखना चाहिए? *(Multiple responses possible, please probe)* *(एक से अधिक उत्तर स्वीकृत हैं। पूछताछ करें।)*	In a cool, dry place ठंडी, सूखी जगह पर……...1 In a covered container ढंके बर्तन में…….....2 Other (specify) अन्य(उल्लेख करें) .....-88 Do not know नहीं मालूम …….....-99
J.06	When should a mother/caregiver of a young child wash hands? किसी छोटे बच्चे की मां/ देखरेख करने वाले को कब-कब हाथ धोने चाहिए? *(Multiple responses possible)* *(एक से अधिक उत्तर संभव है)*	Before eating खाने से पहले …….. 1 After using the Toilet शौचालय के उपयोग के बाद ……. 2 Before feeding a child बच्चे को खिलाने के पहले ……. 3 After cleaning a child who has defecated बच्चे का शौच साफ करने के बाद …… 4 Before preparing food खाना पकाने के पहले …… 5 Before touching a newborn baby नवजात को छूने के पहले ……. 6 Before applying oil to the child बचे को तेल लगाने से पहले ……. 7 Other (specify) अन्य (स्पष्ट करें) _____ ……..-88 Don't know नहीं पता ……. -99
J.07	What materials should one use to wash hands?	Only Water

	हाथ धोने के लिए किस सामग्री का उपयोग करना चाहिए**?** *(Multiple responses possible, please probe)* *(एक से अधिक उत्तर स्वीकृत हैं। पूछताछ करें।)*	सिर्फ पानी …….. 1 Soap साबुन …….. 2 Ash राख …….. 3 Mud मिटटी…….. 4 None कुछ नहीं …….. 5 Other (specify) अन्य (उल्लेख करें) **.....** -88 Don't know नहीं मालूम …….. -99

SECTION II: MATERNAL HEALTH I would now like to ask you some questions about maternal health. अब मैं आपसे कुछ सवाल मां के स्वास्थ्य के बारे में करना चाहूंगा/गी।		
i. Family planning परिवार नियोजन		
J.08	What is the ideal childbearing age for a woman? महिलाओं के लिए बच्चा पैदा करने की क्या आदर्श (/ सही) उम्र है?	Before the age of 18 18 वर्ष के पहले …… 1 After the age of 18 18 वर्ष के बाद …….. 2 Anytime after menstruation ऋतुस्राव शुरू होने के बाद कभी भी … 3 Before the age of 20 20 वर्ष के पहले …….. 4 Other (specify) अन्य (उल्लेख करें) ..... -88 Don't know नहीं मालूम …….. -99
J.09	What is the ideal amount of time/birth spacing between children (in completed years)? दो बच्चों के जन्म के बीच में अंतर का आदर्श समय कितना है (पूरे हुए वर्ष में)?	☐☐ Don't know नहीं मालूम …….. -99
ii. Care of pregnant women **गर्भवती महिलाओं की देखरेख**		
J.10	How often should a pregnant mother have ante-natal checkups? किसी गर्भवती महिला को कितनी बार प्रसव-पूर्व जांच करानी चाहिए? Probe जांच कीजिये	At least 4 times during pregnancy गर्भावस्था के दौरान कम से कम चार बार … 1 Once, when the pregnancy is detected एकबार् गर्भ का पता चलने के समय ……. 2 Once, soon before birth of the child बच्चे के जन्म के ठीक पहले एक बार …… 3 Only if complications occur कोई जटिलता दिखे तभी …… 4 Twice during pregnancy …..…… 5 Thrice during pregnancy ……..… 6

		Other (specify) अन्य (उल्लेख करें) …….. -88 Don't know नहीं मालूम ……. -99
J.11	What vaccinations should a pregnant woman receive? गर्भवती महिला को क्या-क्या टीके/सुई लगाए जाने चाहिए? *(Multiple responses possible)* *(एक से अधिक उतर संभव है)*	T.T. injections टेटनस की सुई …… 1 Other (specify) अन्य (उल्लेख करें) …….. -88 Don't know नहीं मालूम ……. -99
J.12	How many IFA tablets should a pregnant woman take during the course of the pregnancy? किसी गर्भवती महिला को गर्भावस्था के दौरान आयरन-फोलिक एसिड की कितनी गोलियां खानी चाहिए?	Number संख्या_____ Don't know नहीं मालूम ……. -99
J.13	What are the difficulties experienced with IFA tablets? आयरन-फोलिक एसिड की गोलियां खाने से क्या कठिनाइयाँ महसूस होती हैं? (Multiple Response Possible) *(एक से अधिक उतर संभव है)*	Nausea मिचली ……. 1 Constipation कब्जियत …… 2 Darkening of the stool काला पाखाना …… 3 Abdominal discomfort पेट में असुविधा …… 4 Other (specify) अन्य (उल्लेख करें) …….. -88 No difficulty कोई कठिनाई नहीं ……... -95 Don't know नहीं मालूम ……. -99
J.14	How can you recognize a person with anemia? क्या आप बताएंगी कि किसी व्यक्ति में खून की कमी की कैसे पहचान की जा सकती है? *(Multiple responses possible)* *(एक से अधिक उतर संभव है)*	Less energy/weakness कम ऊर्जा/ कमजोरी …….. 1 Paleness/ pallor (pale color in eyes and palm) पीलापन (आंखों और हथेलियों का पीला पड़ जाना) …… 2 Spoon nails/bent nails नाखून मुड़ या झुक जाना …….. 3 More likely to become sick बीमार होने की अधिक आशंका …… 4 Other (specify) अन्य (उल्लेख करें) …….. -88 Don't know नहीं मालूम ……. -99

J.15	What causes anemia? खून की कमी क्यों होती है? *(Multiple responses possible)* *(एक से अधिक उतर संभव है)*	Lack of iron in the diet/ eat too little, not much भोजन में आयरन की कमी/ बहुत कम खाना … 1 Sickness/infection (malaria, other infection such as HIV/AIDS) बीमारी/संक्रमण (मलेरिया, HIV/AIDS जैसे अन्य संक्रमण) …….. 2 Heavy bleeding during menstruation मासिक चक्र के दौरान अधिक रक्तस्राव …….. 3 Other (specify) अन्य (उल्लेख करें) …….. -88 Don't know नहीं मालूम ……. -99
J.16	How should the family prepare themselves for delivery when a baby is due? बच्चा होने वाला हो, तो परिवार को प्रसव की तैयारी कैसे करनी चाहिए, क्या ध्यान में रखना चाहिए? *(Multiple responses possible)* *(एक से अधिक उतर संभव है)*	Keep the Accredited Social Health Activist and Auxiliary Nurse Midwife didi's number handy आशा और ए.एन.एम.(नर्स)दीदी का नंबर अपने पास रखना …… 1 Identify a hospital for delivery प्रसव के लिए किसी अस्पताल को चिन्हित करना 2 Have enough money saved to pay for medicines/delivery charges if any दवाओं/ प्रसव का खर्च होने पर उनके भुगतान के लिए अपने पास पर्याप्त रुपए बचा कर रखना … 3 Have a Disposable Delivery kit ready (Mamta kit) डिस्पोजेबल डिलिवरी किट तैयार करें (ममता किट) ….. 4 Have someone to accompany them प्रसव के समय कोई साथ होना चाहिए …….. 5 Keep the number of the ambulance readily accessible एम्बुलेंस की आसन उपलब्धि के लिए उसका नंबर रखें ……. 6 Keep clean cloth, clean blade etc readily accessible आपात स्थिति के लिए साफ कपडे, ब्लेड आदि रखें …… 7 Other (specify) अन्य (उल्लेख करें) …….. -88 Don't know नहीं मालूम ……. -99

SECTION III: CHILD FEEDING AND HEALTH बच्चे के खानपान और स्वास्थ्य

I would now like to ask you some questions about feeding practices for the child and his/her health. अब हम आपसे बच्चे के खानपान की आदतें और उनके स्वास्थ्य के बारें में कुछ प्रश्न करेंगे		
i. IYCF		
J.17	How long after birth should a baby start breastfeeding? जन्म के कितने समय बाद पहली बार बच्चे को माँ का दूध पिलाना चाहिए?	Immediately after birth जन्म के तुरंत बाद …….. 1 Less than one hour एक घंटे के भीतर …….. 2 Some hours after, but less than 24 hours कुछ घंटे बाद, लेकिन 24 घंटों से पहले ….. 3 One day after एक दिन बाद ……. 4 More than 1 day after एक से अधिक दिन बाद ……. 5 Don't think that the baby should be breast fed……..6 Don't know नहीं मालूम ……. -99
J.18	What should a mother do with her "first milk" or colostrum? माता को "पहले दूध"/ खिसरा/ पिला गाड़ा दूध का क्या करना चाहिए?	Throw it away and start breastfeeding when the real milk comes in इसे फैंक देना चाहिए और असली दूध आने पर स्तनपान करवाना चाहिए …… 1 Give it to her baby by breastfeeding बच्चे को पिलाना चाहिए 2 Other (specify) अन्य (उल्लेख करें) …….. -88 Don't know नहीं मालूम ……. -99
J.19	What can a baby under the age of 6 months be fed? 6 महीने से कम उम्र के बच्चे को क्या खिलाया जा सकता है? *(Multiple responses possible)* *(एक से अधिक उत्तर संभव है)* *Probe* *जांच कीजिये*	Breast milk only केवल मां का दूध …… 1 Breast milk and water मां का दूध और पानी …….. 2 Breast milk, ORS, syrups, and medicine मां के दूध, ओआरएस, सिरप, और दवा ……. 3 Breast milk and any other milk substitutes मां का दूध या कोई अन्य पूरक दूध …….. 4 Other (specify) अन्य (उल्लेख करें) …….. -88 Don't know नहीं मालूम ……. -99
J.20	Do you think that babies under 6 months should be given water if the weather is very hot? आपको क्या लगता है कि बहुत अधिक गर्म मौसम में 6 महीनो से छोटे शिशुओं को पानी दिया जाना चाहिए?	Yes हां …….. 1 No नहीं …… 2
J.21	How long should a child be exclusively breastfed? एक बच्चे को कब तक सिर्फ और सिर्फ मां का दूध ही पिलाना चाहिए?	Months महीनों की संख्या □□ Less than 1 month 1 महीने से कम …….. 0 Don't know

		नहीं मालूम ……. -99
J.22	Until about what age should a baby continue to be breastfed? एक बच्चे को मां का दूध किस उम्र तक पिलाया जाना चाहिए ?	Years ……. 1 साल □□ Months …….. 2 महीने □□ Don't know नहीं मालूम ……. -99
J.23	If a mother thinks her baby is not getting enough breast milk, what should she do? यदि एक मां को यह लगता है कि उसके बच्चे को मां का दूध पर्याप्त मात्रा में नहीं मिल रहा है तो उसे क्या करना चाहिए? *(Multiple response-possible. Do not prompt.)* *(एक से अधिक जवाब दिये जा सकते है। जवाब देने में सहायता न करें।)*	Breastfeed more frequently बच्चे को अधिक बार स्तनपान करवाना चाहिए ……. 1 Give baby other liquids/foods बच्चे को अन्य तरल पदार्थ/ खाद्य पदार्थ देने चाहिए …… 2 Mother needs to drink more water मां को अधिक पानी पीना चाहिए …… 3 Mother needs to eat more food मां को अधिक भोजन करना चाहिए …….. 4 Mother needs to eat food that increases milk production माँ को ऐसा भोजन करना चाहिए जिससे की दूध की उत्पादन बढ़ जाए ……. 5 Other (specify) अन्य (उल्लेख करें) …….. -88 Don't know नहीं मालूम ……. -99

J.24	At what age a child should be given the following foods for the first time: (in months) बच्चे को निम्नलिखित चीजें पहली बार किस उम्र से देनी चाहिए: (महीनों में)	
A	Water पानी	Months महीनों की संख्या □□ Less than 1 month 1 महीने से कम …….. 0 Don't know नहीं मालूम ……. -99
B	Rice, Bread, Pressed rice, chudda etc. चावल, रोटी, चिवड़ा, आदि	Months महीनों की संख्या □□ Less than 1 month 1 महीने से कम …….. 0 Don't know नहीं मालूम ……. -99
C	Legume: daal दलहन: दाल	Months महीनों की संख्या □□ Less than 1 month 1 महीने से कम …….. 0 Don't know नहीं मालूम ……. -99

D	Green leafy vegetables हरी पत्तीदार सब्जियां (साग)	Months महीनों की संख्या ☐☐ Less than 1 month 1 महीने से कम …….. 0 Don't know नहीं मालूम ……. -99
E	Vegetables such as pumpkin, orange yam, carrots, tomato, sweet potato कुम्हड़ा, जमीकंद / अलुआ, गाजर, टमाटर, शक्करकंद आदि सब्जियां	Months महीनों की संख्या ☐☐ Less than 1 month 1 महीने से कम …….. 0 Don't know नहीं मालूम ……. -99
F	Fruits such as banana, papaya, mango केला, पपीता, आम आदि फल	Months महीनों की संख्या ☐☐ Less than 1 month 1 महीने से कम …….. 0 Don't know नहीं मालूम ……. -99
G	Meats such as chicken, mutton, fish, etc. मुर्गा, बकरा, मछली आदि जैसे मांस	Months महीनों की संख्या ☐☐ Less than 1 month 1 महीने से कम …….. 0 Don't know नहीं मालूम ……. -99
H	Eggs अंडे	Months महीनों की संख्या ☐☐ Less than 1 month 1 महीने से कम …….. 0 Don't know नहीं मालूम ……. -99
I	Milk (cow, goat, buffalo or powdered) दूध (गाय, बकरी, भैंस या पावडर वाला)	Months महीनों की संख्या ☐☐ Less than 1 month 1 महीने से कम …….. 0 Don't know नहीं मालूम ……. -99
J	Peanuts, ground nuts and other nuts मूंगफली और अन्य मेवे	Months महीनों की संख्या ☐☐ Less than 1 month 1 महीने से कम …….. 0 Don't know नहीं मालूम ……. -99

K	Purchased snack foods (chips, chocolates) खरीदे गए स्नैक्स (चिप्स, चॉकलेट)	Months महीनों की संख्या □□ Less than 1 month 1 महीने से कम …….. 0 Should not give नहीं देना चाहिए …… -95 Don't know नहीं मालूम ……. -99

ii. Child health

J.25	What causes diarrhea? डायरिया/दस्त/ मूह-पेट चलना होने के क्या कारण है? *(Multiple responses possible)* *(एक से अधिक उतर संभव है)*	Polluted water दूषित पानी…… 1 Contaminated food दूषित खाना …….. 2 Dirty or unhygienic surroundings गंदा या अस्वच्छ वातावरण ……. 3 Germs from open defecation खुले शौच से जीवाणु ……. 4 Other (specify) अन्य (उल्लेख करें) …….. -88 Don't know नहीं मालूम ……. -99
J.26	What are the symptoms of diarrhea? डायरिया/दस्त/ मूह-पेट चलना के क्या क्या लक्षण है? *(Multiple responses possible)* *(एक से अधिक उतर संभव है)*	Having frequent loose motions लगातार ढीले मल होना ……1 Feeling fatigued or fainting थका हुआ या बेहोशी महसूस करना ……2 Become dehydrated शरीर में पानी की कमी हो जाना ……3 Sunken eyes धंसी हुई आंखें ……4 Blood in stools मल में रक्त ……...5 Other (specify) अन्य (उल्लेख करें) …….. -88 Don't know नहीं मालूम ……. -99
J.27	What should you do when your child has diarrhea? अगर आपके बच्चे को डायरिया/दस्त/ मूह-पेट चलना हो जाए तो आपको क्या करना चाहिए? *(Multiple responses possible.)* *(एक से अधिक जवाब दिये जा सकते है।*	Give ORS/home-prepared solution ORS/घर पर तैयार घोल दें ……. 1 Give zinc tablets जिंक की गोली खिलानी चाहिए Give medicines दवाई खिलानी चाहिए .....3 Feed less than usual सामान्य से कम आहार दें …… 4 Feed more than usual सामान्य से अधिक खाना देना.....5 Continue breastfeeding अपना दूध पिलाना ज़ारी रखें …….. 6

		Breastfeed more often अधिक बार अपना दूध पिलाना ……. 7 Give syrups सिरप दें …….. 8 Give traditional medicine पारंपरिक चिकित्सा दें ……. 9 Give treated water साफ पानी दें …….. 10 Give carrot juice or rice water गाजर का रस या चावल का पानी दें …… 11 Give liquids such as dal water, buttermilk, fruit juice दाल के पानी, लस्सी, फल के रस जैसे तरल पदार्थ दे..... 12 Consult a doctor.....13 Other (specify) अन्य (उल्लेख करें) …….. -88 Don't know नहीं मालूम ……. -99
J.28	How can diarrhea be prevented? डायरिया/दस्त/ मूह-पेट चलना से कैसे बचा जा सकता है? Instruction- explain that this is before diarrhoea happens निर्देश – समझाये की ये दस्त से पहले किया जाता है *(Multiple responses possible)* एक से अधिक उत्तर संभव है	Give boiled water for drinking पीने के लिए उबला हुआ पानी दे… 1 Wash hands before cooking for the child बच्चे के लिए खाना पकाने से पहले हाथ धोये…… 2 Do not defecate in open खुले में शौच न करें……... 3 Wash hands after defecation शौच के बाद हाथ धोये…… 4 Other (specify) अन्य (उल्लेख करें) …….. -88 Don't know नहीं मालूम ……. -99

iii. Vaccinations टीकाकरण		
J.29	Which vaccinations should a child get at birth? बच्चे के जन्म पर कौन सा टीकाकरण मिलना चाहिए? *Interviewer: Do not prompt (Multiple response-possible)* *साक्षात्कर्ता : जवाब देने में सहायता न करें। (एक से अधिक जवाब दिये जा सकते है।)*	OPV ओ.पी.वी. …….. 1 BCG बी.सी.जी …….. 2 Hepatitis B हेपेटाइटिस बी …… 3 Pentavalent पेंतावालेंट …….. 4 Other (specify) अन्य (उल्लेख करें) …….. -88 Don't know नहीं मालूम ……. -99
J.30	What is the cost of the immunization card provided to the household by the nurse didi/Accredited Social Health Activist?	Nothing, free of cost कुछ नहीं, मुफ्त है …….. 0 Rupee amount ____रुपए

	नर्स दीदी /आशा दीदी द्वारा परिवार को दिए जाने वाले टीकाकरण कार्ड की कितनी कीमत है?	Don't know नहीं मालूम ……. -99
J.31	How often should the immunization card be updated? टीकाकरण कार्ड को कब-कब भरवाया (अपडेट कराया)जाना चाहिए?	Every time a new vaccination is provided हर बार नया टीका लगने के बाद …… 1 At least once a month महीने में कम से कम एक बार …….. 2 Less than once a month but at least once every six months महीने में एक बार से कम लेकिन 6 महीने में कम से कम एक बार …… 3 Once a year साल में एक बार …… 4 Other (specify) अन्य (उल्लेख करें) …….. -88 Don't know नहीं मालूम ……. -99

SECTION IV: DIETARY DIVERSITY & HOME CULTIVATION
खाद्य विविधता और घरेलू कृषि

Now I will ask you some questions about food and diets
अब मैं आपसे कुछ सवाल खाद्य सामग्रियों और भोजन के बारे में पूछूंगा/गी।

J.32	What are the benefits of eating green, leafy vegetables? हरे, पत्तेदार सब्जियां खाने के क्या फायदे हैं? *(Multiple responses possible)* *(एक से अधिक जवाब दिये जा सकते है।)*	They protect us from illness वे बीमारी से हमारी रक्षा करते हैं….1 They increase our iron intake वे हमारे शरीर में आयरन की मात्रा बढ़ाते है….2 They make our bones stronger वे हमारे हड्डियो को मज़बूत बनाते है……..3 Other (specify) अन्य (उल्लेख करें) …….. -88 Don't know नहीं मालूम ……. -99
J.33	What is the benefit of eating orange-coloured fruits and vegetables?(Eg- papaya, mango, orange) नारंगी रंग का फल और सब्जियां खाने का क्या लाभ है?(जैसे- पपीता,आम,संतरा) *(Multiple responses possible)* *(एक से अधिक जवाब दिये जा सकते है।)*	They protect the body from illness वे बीमारी से हमारी रक्षा करते हैं …..1 Other (specify) अन्य (उल्लेख करें) …….. -88 Don't know नहीं मालूम ……. -99
J.34	What is the benefit of eating pulses and animal source foods – e.g. milk, meat, chicken, fish and eggs? दाल और पशु स्रोत के भोजन खाने का लाभ क्या है – जैसे कि दूध, मांस, चिकन, मछली और अंडे? *(Multiple responses possible)* *(एक से अधिक जवाब दिये जा सकते है।)*	Make our bones stronger वे हमारे हड्डियो को मज़बूत बनाते है …….1 They help the body grow and repair itself वे शरीर को बढ़ने और स्वयं को सुधारने में सहायता करते हैं 2 Other (specify) अन्य (उल्लेख करें) …….. -88 Don't know नहीं मालूम ……. -99
J.35	What is the benefit of eating foods like oil, ghee, sugar, potato and grains?	They provide our body with energy वे हमारे शरीर को ऊर्जा प्रदान करते हैं ….1

	तेल, घी, चीनी, आलू और अनाज जैसे भोजन खाने का क्या फायदा है? *(Multiple responses possible)* *(एक से अधिक जवाब दिये जा सकते है।)*	Other (specify) अन्य (उल्लेख करें) …….. -88 Don't know नहीं मालूम ……. -99		
J.36	What are some of the foods that make our bones stronger? हमारी हड्डियों को मजबूत बनाने वाले खाद्य पदार्थ क्या-क्या हैं? *Multiple responses allowed, do not prompt* *(एक से अधिक उत्तर स्वीकृत हैं।उत्तर देने में सहायता नहीं करें।)*	Milk and milk products दूध और दुग्ध उत्पाद ..... 1 Green leafy vegetables हरी पत्तेदार सब्जियां ..... 2 Meat products मांस उत्पाद ..... 3 Other (specify) अन्य (उल्लेख करें) …….. -88 Don't know नहीं मालूम ……. -99		
J.37	Please list down the components of a tri-coloured meal. कृपया तिरंगे भोजन में क्या क्या होता है -उनके नाम बताए *(multiple responses possible)* *(एक से अधिक उत्तर संभव हैं)*	Orange food items नारंगी खाद्य पदार्थ	White food items सफ़ेद खाद्य पदार्थ	Green food items हरे खाद्य पदर्थ
		1. Pumpkin सीताफल 2. Orange संतरा 3. Carrot गाजार 4. Mango आम 5. Guava अमरुद 6. Apple सेब 7. Jaggery गुड़ 8. Meat मांस 9. Lentils दालें -88. Other अन्य (स्पष्ट करें) Don't know नहीं मालूम ……99	1. Rice चावल 2. Chapatti चपाती 3. Bread ब्रेड 4. Barley जौ 5. Milk दूध 6. Curd दही 7. Ghee घी 8. Fish मछली -88. Other अन्य (स्पष्ट करें) Don't know नहीं मालूम…. -99	1. Spinach पालक, साग 2. Amarnath चौलायी 3. Drumsticks सहजन/सजिना 4. Gourd लौकी 5. Mustard greens सरसों का साग 6. Chenopodium बथुआ 7. Okra भिन्डी 8. Bitter gourd करेला-88. Other अन्य (स्पष्ट करें) Don't know नहीं मालूम ……-99
J.38	Can you tell us some of the benefits of having a kitchen garden? पोषक बाड़ी के क्या फायदे हैं? *Multiple responses allowed, do not prompt* *(एक से अधिक उत्तर स्वीकृत हैं।उत्तर देने में सहायता नहीं करें।)* *(If Respondent Don't Understant, then Probe with Instruction)* *Instruction:* The cultivation of fruits and vegetables for consumption, either in a small space surrounding	Food security खाद्य सुरक्षा.....1 Lower cost of output than on the market उत्पादन की बाजार से कम लागत .....2 Dietary diversity (foods from different groups, often different colours) आहार में विविधता (विभिन्न समूहों के खाद्य पदार्थ, प्रायः विभिन्न रंगों के)…….....3 Can grow what we like to eat अपने खाने की पसंदीदा चीजें उगा सकते हैं.....4 Convenience: don't need to go to the market etc सुविधा: बाजार आदि जाने की जरूरत नहीं.....5		

	the house (including the roof and sack gardens), or in a small part of the household's fields घर के पास छोटी सी जगह मे (छत और बोरी समेत) या परिवार के खेत के छोटे हिस्से मे परिवार के खाने के लिए फल और सब्जी उपजाना	Increased consumption of fruits and vegetables फलों और सब्जियों के उपयोग में वृद्धि…….6 Safer than buying the same products in the market उन्हीं उत्पादों को बाजार से खरीदने से अधिक सुरक्षित 7 Not Aware of Kitchen Gardens पोषक बाड़ी की जानकारी नहीं है ……-95 →J42 Other (specify) अन्य (उल्लेख करें) …….. -88 Don't know नहीं मालूम ……. -99
J.39	What are the vegetables you can grow in kitchen gardens in the summer/Kharif? गर्मियों/Kharif में पोषक बाड़ी में आप क्या सब्जियां उगा सकते हैं? (multiple responses possible) *(एक से अधिक उत्तर संभव हैं)*	1. Okra भिन्डी 2. Tomato टमाटर 3. Egg plant बैंगन 4. Cucumber खीरा, ककड़ी 5. Gourds परवल, करेला, लौकी, तोरी, कुंदरू 6. Onion प्याज़ 7. Colocasia अरबी Other (specify) अन्य (उल्लेख करें) …….. -88 Don't know नहीं मालूम ……. -99
J.40	What are the vegetables you can grow in kitchen gardens in the winter/Rabi? सर्दी//Rabi में पोषक बाड़ी में आप क्या सब्जियां उगा सकते हैं? (multiple responses possible) *(एक से अधिक उत्तर संभव हैं)*	1. Spinach / green leafy vegetables साग/हरे पतेदार सब्जियां 2. Peas मटर 3. Cauliflower फूलगोभी 4. Cabbage बंदगोभी 5. Carrot गाजार 6. Potato आलू 7. Beans बीन्स 8. Turnip शलगम Other (specify) अन्य (उल्लेख करें) …….. -88 Don't know नहीं मालूम ……. -99
J.41	What are the vegetables you can grow in kitchen gardens in the Zaid season?(Zaid- A short duration between rabi and kharif season, mainly from march to June) जायद में पोषक बाड़ी में आप क्या सब्जियां उगा सकते हैं?(जायद- रबी और खरीफ के बीच का मौसम है , मार्च से जून के बीच)	1. Pumpkin कद्दू 2. Cucumber खीरा 3. Musk melon खरबूजा 4. Watermelon

	(multiple responses possible) *(एक से अधिक उत्तर संभव हैं)*	तरबूज 5. Bottle gourd लौकी 6. Sponge gourd तोरी 7. Tomato टमाटर 8. Chili मिर्च 9. Bitter gourd करेला Other (specify) अन्य (उल्लेख करें) …….. -88 Don't know नहीं मालूम ……. -99

SECTION V: SERVICES PROVIDED BY FRONTLINE WORKERS फ्रंटलाइन वर्कर द्वारा दी गयी सेवाए		
J.42	What are the services provided by the Anganwadi worker at the Anganwadi Center? आंगनवाडी वर्कर क्या सेवाएं देती हैं आंगनवाड़ी केंद्र में? *(multiple responses possible)* *(एक से अधिक उत्तर संभव हैं)*	Teach children in the age of 3-6 3 से 6 साल के बच्चों को पढ़ाना …….. 1 Give food to children in the age of 3-6 3 से 6 साल के बच्चों को खाना देना ……..…. 2 Monitor the growth of children up till the age of 6 6 साल तक के बच्चे के बढ़ने पर निगरानी रखना … 3 Weigh pregnant women and children till the age of 6 गर्भवती महिला और ६ साल तक के बच्चों का वज़न जांचना ...4 Keep a count of the pregnant, lactating women and young children गर्भवती, धात्री महिला और छोटे बच्चों की संख्या का हिसाब रखना .. 5 Counselling of pregnant and lactating women गर्भवती और धात्री महिलाओं को सलाह ..... 6 Distribute IFA and Vitamin A to pregnant women, adolescent girls and young children आयरन फोलिक एसिड गोली और विटामिन ए गर्भवती महिला,किशोरी बालिका और शिशु को वितरण …… 7 Refer mother and children to sub-centres, PHC माँ और बच्चे को उप-केंद्र या प्राथमिक स्वास्थ्य केंद्र भेजना …… 8 Supplementary food to lactating women धात्रि महिला को अनुपूरक आहार …… 9 Creche for children बच्चों के लिए झुलाघर ..... 10 Other (specify) अन्य (उल्लेख करें) …….. -88 Don't know नहीं मालूम ……. -99
J.43	What are the services provided by Accredited Social Health Activist? आशा क्या सेवाएं देती हैं? *(multiple responses possible)* *(एक से अधिक उत्तर संभव हैं)*	Take pregnant woman to hospital for delivery गर्भवती महिला को प्रसव के लिए हस्पताल ले जाना …… 1 Take pregnant women and infants for vaccination गर्भवती महिला और शिशु को टीकाकरण के लिए के जाना ….. 2 Visit homes of pregnant women for counselling and homes where children have been born

		गर्भवती महिला के घर जाना सलाह के लिए और वह घर जहाँ बच्चा पैदा हुआ है …….. 3 Give information related to health and nutrition स्वास्थ्य और पोषण से सम्बंधित जानकारी देना …… 4 Keep a count of the pregnant, lactating women and young children गर्भवती, धात्री म्हिला और छोटे बच्चों की संख्या का हिसाब रखना 5 Other (specify) अन्य (उल्लेख करें) …….. -88 Don't know नहीं मालूम ……. -99
J.44	What are the services provided by Auxiliary Nurse Midwife? Auxiliary Nurse Midwife/ नर्स दीदी क्या सेवाएं देती हैं? *(multiple responses possible)* *(एक से अधिक उत्तर संभव हैं)*	Get the MCP card made MCP कार्ड बनवाना …….. 1 Vaccination of pregnant women and infants गर्भवती महिला और शिशु को टीकाकरण करना ……. 2 Check up of pregnant women गर्भवती महिला की जांच करना …… 3 Check up of lactating women धात्री महिला की जांच करना …… 4 Check up of young children शिशु की जांच करना ……... 5 Other (specify) अन्य (उल्लेख करें) …….. -88 Don't know नहीं मालूम ……. -99
J.45	What are the services provided by the CM? CM क्या सेवाएं देती हैं? *(multiple responses possible)* *(एक से अधिक उत्तर संभव हैं)*	Organise SHG meetings स्वयंसहायता समूहकी मीटिंग रखवाना …… 1 Collect savings and maintain record बचत इकट्ठा करना और किताब में हिसाब रखना ……. 2 Give information related to health and nutrition स्वास्थ्य और पोषण से सम्बंधित जानकारी देना …… 3 Visit homes of pregnant women for counselling and homes where children have been born गर्भवती महिला के घर जाना सलाहके लिए और वह घर जहाँ बच्चा पैदा हुआ है ……... 4 Take pregnant women and infants for vaccination गर्भवती महिला और शिशु को टीकाकरण के लिए के जाना …… 5 Conduct survey in village on toilet construction शौचालय बनवाने का गांवमें सुर्वेक्षण करना …… 6 Show videos on diet diversity, kitchen gardens and sanitation आहार विविधता, पोषक बाढ़ी और स्वछतापर विडियो दिखाना… 7 Other (specify) अन्य (उल्लेख करें) …….. -88 Don't know नहीं मालूम ……. -99
J.46	What are the services provided by the HSC(health sub committee)? स्वास्थ्य उप समिति क्या सेवाएं देती हैं? *(multiple responses possible)* *(एक से अधिक उत्तर संभव हैं)*	Give information related to health and nutrition स्वास्थ्य और पोषण से सम्बंधित जानकारी देना …… 1 Visit homes of pregnant women for counselling and homes where children have been born गर्भवती महिला के घर जाना सलाहके लिए और वह घर जहाँ बच्चा पैदा हुआ ……...… 2

		Keep a count of the pregnant, lactating women and young children गर्भवती, धात्री म्हिला और छोटे बच्चों की संख्या का हिसाब रखना 3 Take women to participate in Annaprashan and/or Bachpan Diwas महिलाओं को अन्नप्राशन और बचपन दिवस में भाग लेने के लिए ले जाना ……..… 4 Other (specify) अन्य (उल्लेख करें) …….. -88 Don't know नहीं मालूम ……. -99

G. Literature Review

Search methodology: We referred to studies covered in Kumar et. al 2017 to identify evidence on the impact of women's group-based interventions on maternal and child nutrition outcomes. This review summarizes evidence from 36 studies, published between 1980 and July 2016, reporting on 24 nutritional indicators across infant and young child feeding (IYCF) practices, intake/diet, and anthropometry. In addition to these studies, we identified more recent peer reviewed journal articles that evaluate the link between women's group-based interventions and maternal and child nutritional status in South Asia region. In this search, we included randomized controlled trials (RCTs), quasi-experiments, mixed methods, pre-post program evaluation and cross-sectional studies based in India, Bangladesh, Nepal and Pakistan. While some studies evaluated the impact of behavior change communication (BCC), microfinance, livelihood or multi-sectoral groups-based interventions, others looked at the association between group membership and nutrition outcomes. In total, we reviewed 24 studies from 2004 to 2018. Table F.1 provides basic information about these studies.

Table F.1: Summary of studies examining effects of programs targeted at women's groups on nutrition outcomes in women and children (in descending order of year of publication)

Citation	Country/ region covered	Group-based (Y/N)	Study design (e.g. RCT, mixed methods etc)	Main outcomes
Harris-Fry et al., 2018	NP	Y	Cluster RCT	Diet diversity (woman)
Saville et al., 2018	NP	Y	Cluster RCT	Birthweight, WAZ (child), maternal BMI, institutional deliveries, colostrum discarding, IYCF practices and child morbidity
Nair et al., 2017	IN	Y	Cluster RCT	BMI, MUAC, nutrition wellbeing, diet diversity (woman); birthweight, HAZ, WHZ, WAZ, stunting, wasting, underweight, exclusive BF, CF introduction, protein intake, diet diversity, minimum meal frequency (child)
Harris-Fry et al., 2016	BG	Y	Quasi-experimental	Diet diversity (woman)
Acharya et al., 2015	IN	Y	RCT	Colostrum feeding, early BF initiation, exclusive BF, antenatal care, institutional delivery and other care seeking behavior
Malapit et al., 2015	IN	Y	Cross-sectional	BMI, HAZ, WAZ, WHZ, diet diversity (woman and children)
Younes et al., 2015	BG	Y	Quasi-experimental	Exclusive BF, diet diversity (child), child morbidity, health and hygiene knowledge
Habib and Jubb, 2015	BG	Y	Cross-sectional	Meals consumed per day (woman)
Saha et al., 2015	IN	Y	Quasi-experimental	Feeding colostrum, institutional delivery, toilet ownership
Johnson et al., 2014	IN	Y	Cohort with pre/post evaluation	Early BF initiation, timely introduction of complementary foods, seeking care for respiratory illness and treatment of diarrhea, health knowledge
Prennushi and Gupta, 2014)	IN	Y	Quasi-experimental	Exclusive BF, immunization cards, and knowledge of diarrhea treatment, family planning, assisted deliveries
Miller et al., 2014	NP	Y	RCT	HAZ, WAZ, WHZ, MUACZ, child morbidity
Saha et al., 2013	IN	Y	Cross-sectional	Colostrum feeding, institutional delivery, knowledge about family planning methods
Fottrell et al., 2013	BG	Y	RCT	Early BF initiation, exclusive BF, delivery and newborn care practices
Roy et al., 2013	IN	Y	RCT	Early BF initiation, exclusive BF
Jalal and Frongillo, 2013	BG	Y	Quasi-experimental	BMI, HAZ, WAZ

Citation	Country/ region covered	Group-based (Y/N)	Study design (e.g. RCT, mixed methods etc)	Main outcomes
More et al., 2012	IN	Y	RCT	Antenatal care, institutional delivery, early and exclusive BF, or care-seeking
Kumar and Quisumbing, 2011	BG	Y	Quasi-experimental	Calorie, protein, vitamin A, and iron consumption (woman and child); HAZ, ZBMI, BMI, hemoglobin, stunting, wasting, low BMI, low hemoglobin
Bhutta et al., 2011	PK	Y	RCT	Colostrum feeding, early BF initiation, antenatal care and institutional delivery
De and Sarker, 2011	IN	Y	Quasi-experimental	Protein intake (household), WAZ
Azad et al., 2010	BG	Y	RCT	Uptake of antenatal and delivery services, home-care practices during and after delivery including exclusive BF and health-care seeking behavior
Kumar et al., 2008	IN	Y	RCT	Early BF initiation, given pre-lacteal, institutional deliveries, newborn-care practices
Galab et al., 2006	IN	Y	Cross-sectional retrospective analysis	HAZ
Manandhar et al., 2004	NP	Y	RCT	Antenatal care, institutional delivery, breastfeeding practices

** BF – Breastfeeding; BG - Bangladesh; BMI - Body Mass Index; CF – Complementary Feeding; HAZ – Height-for-Age z score; IN - India; MUAC – Mid Upper Arm Circumference; NP - Nepal; PK – Pakistan; RCT – Randomized Controlled Trial; WAZ – Weight-for-Age z score; WHZ – Weight-for-Height z score*

Summary of literature:

Most of the reviewed studies found no significant improvements in women's BMI. The result for child's dietary diversity outcome is mixed. BCC interventions in India, Nepal and Bangladesh delivered through a PLA approach reported no effect of intervention on maternal BMI or underweight (Nair et al., 2017; Saville et al., 2018) and in fact reported greater improvement in child's dietary diversity in control than in intervention areas (Younes et al., 2015). The interventions being studied in Nair et al. (2017) and Saville et al. (2018) included additional components such as home visits or food and cash transfers along with participatory group meetings. Participation in a microfinance program in Bangladesh did not affect maternal BMI (Jalal and Frongillo, 2013), and participation in economic and social groups in Nepal found no association with women's BMI or child dietary diversity (Malapit et al., 2015). However, PLA combined with home visits did improve self-reported dietary diversity of children in rural eastern India (Nair et al., 2017). A livelihoods intervention looking at the adoption of agricultural technologies in Bangladesh was the only study we reviewed that found significant improvement in women's BMI in some field sites (Kumar and Quisumbing, 2011).

BCC interventions in Bangladesh delivered through a PLA approach and BCC interventions in India reported significant improvements in women's dietary diversity score (Harris-Fry et al., 2016; Nair et al., 2017) and women's health, nutrition and sanitation knowledge (Johnson et al., 2014; Younes et al., 2015; Harris-Fry et al., 2016). In Nepal, provision of PLA with or without cash or food transfers was broadly beneficial for maternal nutrition but the largest effect on dietary diversity was observed in the PLA plus cash arm (Harris-Fry et al., 2018). However, two cross sectional studies in Nepal and Bangladesh studying the relationship between group membership and women's dietary diversity (Malapit et al., 2015) or frequency of daily food intake (Habib and Jubb, 2015) found no significant association. Moreover, unlike BCC, livelihood group-based intervention did not significantly improve participants' health and nutrition knowledge. The intervention, however, significantly increased the participant's likelihood of benefitting from various targeted government programs such as the NREGA, midday meal in schools, hostels, and housing programs (Prennushi and Gupta, 2014).

Most of the studies evaluating BCC, livelihood and microfinance groups-based programs reported a positive and significant effect of these interventions on IYCF, health, hygiene and sanitation practices. BCC delivered either through the PLA approach or through health workers in India, Pakistan and Bangladesh reported improvements in several IYCF indicators (Kumar et al., 2008; Bhutta et al., 2011; Roy et al., 2013; Johnson et al., 2014; Acharya et al., 2015; Younes et al., 2015) and in certain health practices (Johnson et al., 2014; Acharya et al., 2015; Saville et al., 2018). A BCC intervention involving PLA plus health system strengthening led to significant gains in breastfeeding practices (Fottrell et al., 2013) and a BCC intervention focusing on perinatal care found a greater likelihood of institutional delivery and receipt of antenatal care in treatment arm (Manandhar et al., 2004). Respondents from villages with an SHG present were more likely to feed colostrum and deliver in an institution than respondents from villages without SHGs (Saha et al., 2013). Health care program layered on microfinance program was also associated with an improvement in institutional delivery, colostrum feeding and toilet ownership in India (Saha et al., 2015) and livelihoods intervention was associated with improvements in sanitation practices in Nepal (Miller et al., 2014). A few studies, however, failed to detect any significant impact of BCC and livelihoods interventions on IYCF and health practices. Contrary to Fottrell et al. (2013), Azad et al. (2010) found no significant effect of health system strengthening and PLA meetings on IYCF practices in Bangladesh. Even when combined with additional features such as home visits, the PLA approach failed to affect IYCF and health practices in India (More et al., 2012; Nair et al., 2017). Similarly, a program for women's empowerment and rural livelihoods being rolled at SHG level, focusing on nutrition and health of women

and child through the nutrition cum-day care centers found no significant difference in exclusive breastfeeding between participants and non-participants in India (Prennushi and Gupta, 2014).

The evidence on the relationship between women's group-based interventions and anthropometric outcomes and morbidity for children is mixed. BCC interventions in India and Nepal had no effect on most child anthropometric outcomes or on child morbidity (Nair et al., 2017; Saville et al., 2018). No association was found between group membership and child Height-for-Age z score (HAZ) in India (Galab et al., 2006) and between the group membership component of the women's empowerment in agriculture index (WEAI) and child anthropometry outcomes in Nepal (Malapit et al., 2015). Similarly, being a member of a women's borrower group was not associated with child Weight-for-Age z score (WAZ), although women's earnings from group saving activities was (De and Sarker, 2011). Microfinance and livelihood groups-based interventions were relatively more successful in changing some anthropometric outcomes. A poverty reduction program in Bangladesh led to a significantly higher child weight-for-height z score (WHZ) (Jalal and Frongillo, 2013). A livestock promotion program in Nepal led to an improved child HAZ, although it did not affect child morbidity (Miller et al., 2014) and adoption of improved vegetable technologies reduced stunting in Bangladesh (Kumar and Quisumbing, 2011). We came across only one study which found a significant decline in self-reported child morbidity because of PLA based BCC intervention (Younes et al., 2015).

H. Key platforms and actors

Key Platforms/ Actors	Description

Self-Help Groups	• A savings group of 8-11 women facilitated by a Community Mobiliser
	• Meets once a week to pool in savings to deposit in the bank to accrue interest used for borrowing needs.
	• Through the SHG, members can acquire grains and poultry at reasonable, save separately for medical emergencies and can take loans from the VO for sanitation purposes.
	• Funds allocated – SHGs entitled to
	  o An Initial Capitalisation Fund (ICF) of amount Rs. 15000
	  o Borrow from their own Revolving Fund (RF) (in case of emergency) to which they contribute Rs 10 per member, per week.
	  o Demand a loan from the VO and a Health Risk Fund (HRF) to which they contribute Rs. 10 per member per month.
	• Funds Remitted – Pays a fixed yearly "licensing fee" to the VO. Also makes contribution to the HRF pool and pay interest on loans borrowed from the VO.
	• Sub-committees – The Executive Committee comprising the President, Secretary and Treasure.

Village Organisation (VO)	• Made up of 12-20 SHGs.
	• Meets (average 4 hours per meeting) twice a month – once to discuss financial matters and the other time to discuss social issues and messages.
	• Funds allocated – SHG can access the funds
	  o From Health Risk Fund, Food Security Fund, Sanitation, Health and Nutrition fund
	  o Loans from banks where they do not have to repay the principal amount and the interest rate.
	• Funds remitted –Fixed yearly payment of "licensing fee" to CLF. Also pays interest on funds accessed through the CLF.
	• Sub-Committees –
	  o Executive Committee comprising the President, Secretary and Treasure.
	  o 5-6 different sub-committees including the Health Sub-Committee, Procurement Committee, Repayment Committee, Bank Committee, School Monitoring Committee and the Food Security Committee.

Cluster Level Federations (CLF)	• Constituted by the federation of 25-30 Village Organizations. • Meetings are attended by the Executive committee-the President, Vice President, Secretary, Vice Secretary and Treasurer of each member VO. Meeting recorded by the Master Book-Keeper who also maintains records of various types of loans granted and repaid. • Sub-committees – VO monitoring and capacity development, Health & Nutrition, Livelihoods, General welfare, Procurement, Bank & Finance related, and CLF logistic & property (management).

Village Health Sanitation and Nutrition Day (VHSND)	• Organized once a month to measure
	  o Anthropometric indicators of pregnant and lactating women and children under the age of 2.
	  o Health check-up of haemoglobin (Hb) and blood pressure (BP) and immunization for the participants such as tetanus.
	  o Immunization of children.

Annaprashan Diwas	• Organised by AWW on a set day every month (typically the 19th) to
	  o Initiate complimentary feeding for children completing 6 months.
	  o To educate mothers and family about right Infant and Young Child Feeding (IYCF) practices.

	• Children, mothers and grandmothers are expected and encouraged to attend this event.
Bachpan Divas	• Organized by AWW at the Anganwadi Centre (AWC) every Saturday staggers the following activities in respective Saturdays: pregnant women on the 1st Sat, 2nd lactating, 3rd with children, and 4th with school related issues. • Helped by the ASHA and CM to mobilize attendance.
Community Mobiliser (CM)	• One CM for 8-19 SHGs. Main frontline worker of JEEViKA-MC pilot. • Responsibilities- o Facilitate SHG meetings and keep records of attendance, loans, repayments, savings etc. Record-keeper is in all areas, not just in the treatment GPs. o Under JEEViKA MC- CMs are trained on BCC modules by Block Health, Sanitation and Nutrition Implementer and Master Trainers. o Provides health and nutrition information and training to the SHG members through SHG meetings once a week. o Micro-planning of the SHG demands for grain procurement through Food Security Fund (FSF). o Communicates requests for kitchen garden assistance and poultry requirements of the SHG members. o Helps the ASHA and AWW mobilize and register pregnant and lactating women for interventions delivered through the ICDS and health systems. • Renumeration- o Initially JEEViKA pays the salary of the CM, but overtime a certain amount of the CMs salary will be contributed by the SHG, and the remainder share would be contributed by the VO. o Current Range- Rs.1750-Rs.2350 per month. However, there is lack and delay of payments made.
Community Coordinator (CC)	• 3 CCs per block cluster • Responsibilities- o Attends SHGs meetings, interacts with the members, monitors their book-keeping and minutes, and verifies or fills in missing information. o Takes part in social and financial VO meetings. o Ensures modular training is implemented at the SHG level by checking SHG records. o Attends cluster meetings/trainings to identify bottlenecks in implementation.
Area Coordinator (AC)	• One AC per block cluster • Responsibilities- o AC receives information from the CC about the gaps and problems in the implementation. o Visits the homes of SHG members and SHG meetings to assess the BCC flow and to address the problems any household might have. o Convenes Panchayat Convergence Committee to identify problems in the village and how each stakeholder can work to resolve them.
Health Sub-Committee (HSC)	• Three members per committee • Responsibilities– o Coordination with frontline workers, mobilizing the community for and providing counselling at Annaprashan Diwas, VHSND and Bachpan Diwas. o Members currently being recruited and provided training to undertake some CM responsibilities such as disseminating information and visiting homes of noncompliant women.

Village Resource Person (VRP)	• One per VO • Responsibility – Attends one meeting with every SHG at least once a month, conducting micro-planning of home cultivation activities.
Accredited Social Health Activist (ASHA)	• Responsibilities– o Conducts home visits for pregnant women and also passes on information about the Village Health Sanitation Nutrition Committee. o Maintains a register of pregnant and young mothers. o Mobilises SHG members and mothers of young children to attend VHSND, Bachpan Diwas and Annaprashan Diwas with the help of CM. o Plays video recording from mobiles out to mothers for information dissemination. o Takes people to the Primary Health Center (PHC) if they exhibit symptoms of major diseases. o Attends – ASHA Diwas, VO and panchayat meetings
Auxiliary Nurse Midwife (ANM)	• In-charge of 3 VHSNDs and 8 Anganwadi centres. • Responsibilities– o Performs immunization in villages throughout the week. o Measures the anthropometric indicators, haemoglobin and blood pressure of women who visit VHSND, gives tetanus injections and other booster doses. Also weigh children under 3 once a month. o Maintains mother and child protection card (MCP), conducts home visits, refers malnourished children and mothers to the treatment centre. o Gets help from ASHA and AWW for keeping records and regularly meeting pregnant and lactating women. o Attends the HSC meeting once a month and attends the VO meeting sometimes.
Anganwadi Worker (AWW)	• Runs the Anganwadi Center • Responsibilities– o Teaches children aged 3-6 and makes 3 year olds play games, tells pregnant women and young mothers about cleanliness, complementary food and feeding during 0-6 months during Annaprashan Diwas. o Mandated to make 2 homes visit in a day and maintain records of all households. o Conducts measurements and records the progress of malnourished and severe acute malnourished children. Sends pregnant and lactating women and mothers with children under the age of two form her SHGs to the AWW for their registration and immunization card. o Organizes the Bachpan Diwas and Annaprashan Diwas and mobilizes attendance for VHSND. Meets with the ASHA and ANM at the VHSND. Also meets the ASHA at the Bachpan Diwas and they help in registering the women. o Attends Anganwadi monthly meeting, VO meetings (less frequently), Sector Baithak meeting and Block Baithak.
Community Nutrition Resource Person (CNRP)	• One CNRP in each panchayat • Responsibilities– o To coordinate all health and nutrition activities at the Panchayat level. o Required to visit the VHSND, Annaprashan diwas and Bachpan diwas, monitor the rollout of BCC and will also have a role in sanitation. o Visit VO meetings to facilitate health and nutrition (H&N) discussions there and support the HSC in their training and in-home visits. • Remuneration and work-days o Required to work up to 10 days a month. o Report to and will be paid by the CLF at the rate of INR 160 per day, for a maximum amount of INR 1600 per month.

Health Risk Fund (HRF)	• Introduced for SHG members within the VO to borrow at lower interest rates for health-related emergencies. • SHGs also contributes to save for this fund-Rs. 10 per member per month. • Amount – Rs. 50,000 • Rate of interest – 1%
Food Security Fund (FSF)	• Introduced at the VO level to finance collective procurement of food grains for rural households facing food shortages in lean seasons. • CMs map the food requirements of SHG members every 4-5 months and the procurement committee of the VO then purchases grains for the SHGs at a rate acceptable to the poorest of the poor through the FSF. • Earlier this fund was used only for grains (rice and wheat) but now even pulses, oil, soya bean nuggets and iodised salt are being purchased through the FSF. • While available in all JEEViKA areas, an extra focus on pregnant and lactating women in the treatment areas who get preference in purchases. • Only once 40% of the loan has been repaid can another demand for food through the FSF be made. • Amount – Rs. 1 lakh • Rate of interest – 0