A Mother's Voice: Impacts of Spousal Communication Training on Child Health Investments

Martina Björkman Nyqvist*
Seema Jayachandran†
Céline Zipfel‡

January 22, 2024

Abstract

This study evaluates a communication training program for mothers in Uganda, motivated by prior evidence suggesting that mothers often prioritize children's needs more than fathers. The program aims to enable women to effectively communicate their knowledge and preferences about child health to their husbands, thereby increasing investments in children's health. Using a randomized experiment, we find that the program increases spousal discussion about the family's health, nutrition, and finances. It also increases women's and children's intake of animal-sourced foods, as well as household spending on these foods. We find that birthweight of newborns increases. However, the program did not increase households' adoption of measured health-promoting behaviors or improve other child anthropometric measures.

*Stockholm School of Economics
†Princeton University
‡Stockholm School of Economics

We thank the editor Tom Vogl and two anonymous referees for valuable comments and suggestions, as well as Kalle Hirvonen for sharing his expertise on early childhood nutrition and growth faltering in developing countries. We also thank Fadhil Nadhif Muharam, Juliana Ariza Sánchez, Martin Albouy, Alejandro Favela, Lydia Kim, Suanna Oh, Alexander Persaud, and Andrea Guariso for excellent research assistance; Pia Raffler, Doug Parkerson, Daniele Ressler, Vianney Mbonigaba, Josh Bwiira, Mary Langan, Jaye Stapleton, Crossley Pinkstaff, Jemma Rowlands, Austin Land, and Leslie Marshall for supervision of field activities; Jaye Stapleton and Pricilla Marimo for project management; IPA-Uganda for project implementation support; and the USAID Uganda Mission, Dianna Darsney de Salcedo, and Carlos Rodriguez for support. Financial support from USAID and Mistra (the Swedish Foundation for Strategic Environmental Research) is gratefully acknowledged. The study was registered in the American Economic Association trial registry (AEARCTR-0000073) and received institutional review board approval from Northwestern University (Jayachandran's previous affiliation) and the Uganda National Council for Science and Technology.

1 Introduction

In 2019, over 5 million children died before reaching the age of five (IGME 2020) and more than 130 million children under age five suffered from stunting in low- and middle-income countries (UNICEF 2020). Early-life investments in health and nutrition play a key role in lowering these numbers (Bhutta et al. 2014; Alderman and Fernald 2017). Previous research documents the existence of mother-father gaps in child health investments: additional resources in the hands of women are more likely to be steered towards improving children's health and family nutrition (Thomas 1990, 1997; Duflo 2003; Qian 2008; Armand et al. 2020; Dizon-Ross and Jayachandran 2023). This pattern is consistent with mothers having a stronger preference for spending on children and is the main cited reason for social welfare programs, such as conditional cash transfers, targeting payments to women in many contexts (Fiszbein et al. 2009).

In this paper, we evaluate a program designed to boost child health and nutrition investments in an environment where women might have stronger preferences for investing in children, but men have more decision-making power in the household. Targeting transfer payments to women may not always be feasible (Bourgault and O'Donnell 2020), or desirable, for example because of concerns about intra-household disputes or violence.[1] Our study takes a different tack to increase women's voice in the household regarding child health and nutrition: We evaluate the impacts of providing communication skills training to women to study whether this can strengthen their influence over child health and nutrition investments through the channel of assertive dialogue with their husbands.

We leverage an experiment that randomized access to three different interventions across villages in southwest Uganda. Two treatment arms consisted of offering health classes to parents, providing them with information on how to improve children's health and well-being. In one set of villages, these classes were offered to fathers exclusively, and in another, only to mothers. In the third treatment arm, women were trained in a curriculum on assertive communication *in addition* to the health curriculum.

The experiment, which we conducted from 2012 to 2014, was designed to test two distinct hypotheses. The first is that, because men hold most of the power in the household, increasing their knowledge about child health might be a more effective path to improving child health and nutrition than focusing on mothers. Björkman Nyqvist and Jayachandran (2017) find evidence rejecting this hypothesis: targeting health classes to mothers improved adoption of health-promoting behaviors by the household more

[1] Donald et al. (2023), using surveys from 12 sub-Saharan African countries, find that sole decision-making by women is associated with the highest rates of intimate partner violence. This raises concerns that policies that increase women's control over household resources may make them more vulnerable to domestic violence.

than when the same training was provided to fathers.[2] The second hypothesis, which is the focus of this paper, is that women need more say in the household to be able to shift household investments towards improving child health and nutrition. To test whether communication skills are one way of achieving this, we compare the impacts of women receiving the communication-plus-health-skills intervention to their receiving the health skills intervention alone.

Our analysis yields five main findings. First, women assigned to the communication training were more likely to report improvements in their relationship along several dimensions. They communicated better with their partners, had fewer arguments, and stated that their husbands were more likely to share the household's finances with them. They were also significantly more likely to make decisions about the family's health and expenses jointly with their husbands. These improvements in spousal communication and shared decision-making are as perceived by women; men do not perceive the same changes.[3] Second, women offered the bundled communication and health knowledge training were more likely to discuss targeted health topics and household budgeting with their husbands. A surprising finding is that this increase in spousal discussion did not affect *husbands'* knowledge about child health needs, suggesting that either women did not share their new knowledge in these discussions or that men did not retain the information passed on by their wives.

Third, we do not detect any differential impacts of the communication-plus-health-skills program on households' overall adoption of health-promoting behaviors compared to the women's health classes alone. The share of households implementing recommended health behaviors around newborn and maternal health was significantly higher in the women's health curriculum arm than in the control group, but the addition of communication training did not improve these outcomes further. Fourth, while women's and children's consumption of starchy foods, fruit, and vegetables increased by similar proportions with or without communications training, only households in the communication-plus-health-skills arm increased their intake of animal-sourced foods. To investigate the mechanisms driving these effects, we examine household spending on food categories. Mirroring the patterns on food intake, we only observe a significant increase in expenditure on meat/fish in the communication-plus-health-skills group. This suggests that women may have applied their newly acquired

[2] Fitzsimons et al. (2016), using an experiment in Malawi, also show that increasing mothers' knowledge of the child health production function improves child health and nutrition. The comparison of the impacts of mothers' and fathers' health classes in Björkman Nyqvist and Jayachandran (2017) suggests that the strategy of up-skilling the typically more powerful parent (fathers) is not the most direct or effective way to help children.

[3] Women reporting that they have decision-making power has been associated with improved health and well-being for them and their children, even when their husbands report differently (Ambler et al. 2021; Annan et al. 2021). That said, we discuss the possibility that women's reports reflect experimenter demand effects in section 3.

communication skills to shift household spending towards these foods. Finally, we study impacts on downstream child health outcomes. We do not detect significant effects on anthropometrics of young children, measured in the endline survey. However, the communications training led to a significant improvement in the birthweight of newborns.

Taken together, these findings suggest that the communication skills training, while effective at improving spousal communication and women's satisfaction with their relationships, did not shift household decision-making power towards mothers enough to produce transformative impacts on child health, but may have led to some improvements.

Our paper makes two main contributions to the literature. First, it is one of few studies exploring the role of spousal communication in how households allocate resources to children. While previous public health research investigates whether husbands' engagement and couples' communication together can improve maternal health outcomes (e.g., Sitefane et al. 2020), a unique feature of our experimental design is that it allows us to *isolate* the impact of mothers' communication skills on household investments in health and nutrition. Among existing experiments, our program is closest in design to Ashraf et al. (2020), who, by providing negotiation skills training to adolescent girls, also study the impact of communication skills on joint family decisions when participants' preferences are not aligned with those of the household's primary decision-maker(s).

The modest impacts of the communication skills training is consistent with couples facing more than one constraint in the way they communicate and make decisions about investments in children. Björkman Nyqvist and Jayachandran (2017) document asymmetric impacts of the men's and women's health skills programs on spousal knowledge of child health needs: offering the health training to men improved their wives' knowledge, while offering it to women did not change their husbands'. Other recent research investigating knowledge-sharing and learning frictions within the household yields similar conclusions. Conlon et al. (2022) and Fehr et al. (2022) document gender asymmetries in indirect learning from spouses in India and Germany, respectively. Both of these experimental studies find that men are less likely to retain or use information if they receive it from their wives than if they directly learn it themselves. The fact that our communication skills intervention did not improve what men retained *despite* prompting women to communicate more about targeted health topics with their partners suggests that women's communication skills may not be the only bottleneck to efficient knowledge-sharing within the household.

Our second contribution is to the literature studying whether women's share of decision-making power impacts household spending and child health investments. Previous research examines plausible shifts in women's bargaining power from increased

control over productive assets such as agricultural land (Menon et al. 2014) or unearned income such as cash transfers. On the latter, recent reviews of the literature conclude that the evidence may be more mixed than the conventional wisdom in policy spheres would suggest. For example, a review by Almås et al. (2020) indicates that targeting cash transfers to mothers tends to increase food spending, which can also boost the nutritional value of family diet (e.g., Armand et al. 2020), but has mostly muted effects on child health (e.g., Akresh et al. 2016). These conclusions are broadly in line with those we draw from our evaluation of a program that seeks to enhance women's assertiveness in the household decision-making process whilst leaving household income unchanged. The fact that offering mothers communication training enhanced spousal dialogue and altered household spending suggests that soft skills interventions may be a viable alternative to female-targeted transfers for increasing women's voice in the household, though perhaps with only modest downstream benefits.

2 Study Design and Data

This study is set in Uganda, where poor child health outcomes are a major policy concern and women have limited decision-making power within the household. Uganda's under-5 mortality rate was high at the start of our study in 2013, at 62 deaths per 1,000 births (IGME 2013), and a third of children under the age of five were stunted in 2011 (ICF 2011). That same year, 42% of married women in Uganda reported not having a say in large household purchases and 29% believed that their husband was justified in beating them if they argued with him (ICF 2011).

2.1 Experimental design

The randomized trial enrolled 5516 households across 412 villages (around 13 households per village) in four rural districts in southwest Uganda. After completion of baseline surveying in 2013, villages were randomly assigned to three treatment groups and one control group. We label the three treatment arms as follows: (1) Men's Health & Nutrition (MHN, 105 villages); (2) Women's Health & Nutrition (WHN, 105 villages); (3) Women's Communication and Health & Nutrition curriculum (WCommHN, 98 villages).[4] All arms include village-level training sessions providing either fathers (in the MHN group) or mothers (in the WHN and WCommHN groups) with knowledge to improve children's health and well-being. The health knowledge curriculum was designed to teach couples about safe antenatal and birthing practices, recommended

[4]The randomization was stratified along two village characteristics measured at baseline: above-median women's decision-making power (based on an index of survey questions) and above-median child and maternal health (based on an index of anthropometric measures).

breastfeeding behaviors, nutrition needs for women and children, sanitary food and water preparation, and included a module on family planning. Each health training session lasted one hour.[5]

In the WCommHN villages, after each health training module, women received training in assertive communication skills. The communication training, which is the focus of this paper, was designed to give women more say in household decisions about child health and nutrition investments by enhancing spousal dialogue. It covered a range of topics over 19 sessions (each around 45 minutes long) which engaged the female participants in role-playing conversations to practice discussing topics taught in the health and nutrition course with their husbands. The common thread was the importance of effective spousal communication in improving the household decision-making process. Different sessions offered tips and opportunities to practice communications aimed at specific goals such as infant and antenatal needs, HIV testing and family planning, and child nutrition and healthcare. Several sessions also emphasized applying the communication and negotiation skills to collaborate with their husbands on household budgeting and financial planning. Appendix B2 provides more details about the communication curriculum.

A priori, the communication skills program could influence household investments in child health and nutrition through several channels. First, it could motivate women to share with their husbands the information they acquired from the health curriculum (e.g., on the importance of maintaining a diverse diet or deworming children regularly). This new knowledge might lead husbands to reallocate household funds towards these investments (with or without increasing total spending on child well-being). Second, improved spousal dialogue could make husbands more receptive to women's preferences and thus increase spending on what their wives value, even as the husbands maintain control over the finances. Third, women could become more directly involved in household budget decisions because of their greater willingness and ability to discuss the household's finances with their husbands. This would also lead to their preferences being better reflected in household choices. This channel could be particularly important if women's financial planning skills also improve through the program. With the second and third channels, women's improved communication skills are a pathway for them to attain more household bargaining power.

Our main test compares the impacts of the two interventions targeting women –

[5]To incentivize participation, male participants received 1,000 UGX (~$0.40) at every session, and female participants received 1,000 UGX at every other session. The rationale for this difference is that, absent financial incentives, men are less likely to participate than women (less flexible employment, lower interest level in the topics). Even with the higher incentive level, the average participation rate was 60% for fathers compared to 78% and 76% for women in the WCommHN and WHN groups, respectively. Men's lower attendance could partly explain the lower intent-to-treat effects of the MHN program compared to WHN, as emphasized in Björkman Nyqvist and Jayachandran (2017).

WHN and WCommHN – but we also discuss their effects relative to the control group, and we report the effects of the men's health classes (MHN) for completeness.[6]

We sampled couples who resided together and either had a child under two years of age or were pregnant. The relevant parent (mother in the WHN and WCommHN arms) in treated villages was invited to attend biweekly meetings over the course of 10 months, from February to November 2013. We designed the Communication and Health & Nutrition curricula with support from local health consultants and advocacy organizations. Local facilitators we hired and trained through our project's implementing partner, Innovations for Poverty Action (IPA), delivered the classes. Facilitators were of the same gender as participants and had college degrees in a health or nutrition field.

2.2 Data

The analysis uses data from a baseline survey, run between August 2012 and January 2013, and an endline survey which was collected from March to September 2014. The endline survey collected data on a wide range of knowledge, health, and nutrition outcomes via a questionnaire administered to women, a shorter men's questionnaire, and anthropometric measurements of mothers and young children. In each household, the husband and the wife were interviewed separately.

To assess the impacts of the women's communication program along the hypothesized causal chain, we focus on measures of women's assertiveness in their discussions and communication with their husbands, frequency of spousal discussions about household health and nutrition matters, the spouse's knowledge of child health and nutrition needs, and household health behaviors (e.g., sanitation practices, adherence to guidelines around newborn and maternal health). To study household resource allocation, we examine changes in food spending and food intake outcomes constructed from 24-hour food recalls for women and children. These outcomes, with the exception of men's knowledge, are as reported by women. (The Appendix presents results using men's responses for outcomes covered in the men's survey.) We also collected anthropometric measurements to evaluate downstream effects on health outcomes.

2.3 Empirical strategy

We estimate the following linear regression model:

[6] Björkman Nyqvist and Jayachandran (2017) compare the impacts of the women's (WHN) and men's (MHN) health classes.

$$y_{ijd} = \alpha + \beta_1 WCommHN + \beta_2 WHN + \beta_3 MHN + \gamma X_{ijd} + \eta_j + \rho_d + \varepsilon_{ijd} \quad (1)$$

where $WCommHN$, WHN and MHN are indicator variables for assignment to the three intervention groups, X_{ijd} is the baseline value of the dependent variable (whenever it is available), η_j are stratum fixed effects and ρ_d are district fixed effects. We cluster standard errors at the village level.

We often have several related outcome measures. To assess the impact on a set of K related outcomes, we follow Kling et al. (2007) to derive Average Standardized Treatment Effects (henceforth ASTE):

$$\tilde{\beta} = \frac{1}{K} \sum_{k=1}^{K} \frac{\hat{\beta}_k}{\hat{\sigma}_k},$$

where $\hat{\beta}_k$ is the point estimate on the treatment indicator in the k^{th} outcome regression and $\hat{\sigma}_k$ is the standard deviation of the control group for outcome k (see Duflo et al. 2007). For ease of interpretation, we normalize each index by the mean and standard deviation of the control group. We report treatment effects on each component of the ASTEs in the Appendix.

Our main hypothesis is that the WCommHN intervention had larger effects than the WHN training alone, so we report the p-values of the test of equal impacts across these two treatments throughout. We also discuss effects of the WCommHN treatment with respect to the control group. Appendix Table A1 shows that baseline variables are balanced between each treatment arm and the control group as well as across the WCommHN and WHN arms. The p-value of the joint significance test is 0.82 for WCommHN compared to control, and 0.18 for WCommHN compared to WHN.[7]

While the overall attrition rate in our sample was low ($< 5\%$) and not statistically significantly different across arms (Appendix Table A2a), differential attrition by baseline characteristics between the WCommHN and WHN treatment arms is marginally significant (Appendix TableA2b). We show robustness of our results to using Lee bounds (Lee 2009) in Appendix Tables A3a-A3e.

[7]We test for baseline balance for a set of standard demographic and socioeconomic outcomes (number of children under 5 years old, woman's age, years of education, and whether she earns an income) plus all the main outcome variables of our regressions that were also collected at baseline.

3 Results

This section discusses the effects of the WCommHN intervention on five sets of outcomes: women's relationships; spousal communication; health-promoting behaviors; food intake; and child health outcomes. Whenever the outcome is an index grouping several variables, components of the index are listed in the table notes. (Many of the outcomes are self-reported, and we discuss the possibility of experimenter demand effects at the end of this section.)

Finding 1: Women reported improvements in their relationship with their husbands.

In Table 1, we test whether the WCommHN treatment enhanced women's dialogue and communication skills within the household and to what extent this benefited their relationship with their male partner and their say in household decisions.

Column (1) displays the ASTE of an index pooling six outcomes that capture effective spousal communication, such as listening, lack of conflict, and whether couples share information and finances. The estimate shows that WCommHN improved marital relationships by 0.210 standard deviations of the control group. In contrast, the women's health classes alone (WHN) increased this index by only 0.045 standard deviations (henceforth SD). The p-value of 0.000 indicates that we can reject the null hypothesis of equal impacts across the WCommHN bundled treatment and the WHN training alone.[8] Appendix Table A5a unpacks the index and shows that women in the WCommHN group reported a higher degree of listening between them and their partners (in both directions) and were more likely to share information with their husbands. They also reported fewer arguments with their husbands and that they shared responsibilities more equally – both in terms of their husbands' involvement with the family and how likely they were to share household finances with them.

Column (2) shows the ASTE pooling variables asking whether the woman has a say in a range of household decisions: daily household needs, major household purchases, whether to save or spend household money, buying women's clothing, children's health costs, what and how much to feed the children, children's schooling expenses, buying clothes for the children, and how to spend her earnings. Each of these variables equals 1 if the woman makes the decision alone or jointly with her husband, and 0 if the husband makes the decision alone. Women assigned to WCommHN perceived their decision-

[8]Men whose wives were assigned to participate in WCommHN also report improved relationships compared to the control group, but the effect is only marginally significant, as reported in Appendix Table A4a. The point estimate is larger for WCommHN than WHN, but they are not statistically distinguishable. Appendix Table A4a also reports results based on men's responses for the other outcomes in Tables 1 and 2, and this pattern is seen fairly consistently. One exception is the statistically larger impact of WCommHN on the share of men who report making decisions jointly with their wives (p=0.022). Appendix Table A4b also shows a significantly larger increase in the share of couples where *both* spouses report that they make decisions together (p=0.031).

making power to be higher than women in the control group, by 0.107 SD on average. This estimate is statistically significant at the 5% level. The estimated treatment effect is twice as large for WCommHN as for WHN, but these two effects are not statistically distinguishable (p=0.204).

In column (3), we report the ASTE of *joint* decision-making by the couple. This index is constructed from the same set of questions as the one in column (2), but here, the components of the index are variables equal to 1 if the couple makes the decision together and 0 if *either* the wife or the husband makes the decision unilaterally. Column (3) shows that WCommHN increased the share of women who made decisions jointly with their husbands more than WHN alone (p=0.013). The index is 0.143 SD higher in the WCommHN group compared to the control, while WHN had no detectable impact.

The larger effects we find on the joint decision-making index in column (3) compared to the index capturing whether women have a say in household decisions in column (2) suggest that the communication skills intervention caused some women to involve their husbands in decisions that they were previously making alone. Appendix Tables A5b and A5c, which report treatment effects on the components of the indices in columns (2) and (3), indicate that the stronger impact of the WCommHN program on the joint decision-making index may also reflect a shift from unilateral decision-making by the husband toward involvement of the wife in certain decisions, such as whether to save or spend money. Overall, the results in columns (2) and (3) are consistent with the finding above that women in the WCommHN group reported more equal involvement of spouses in family matters and household finances, as well as less spousal conflict.

Finally, column (4) reports treatment effects on domestic violence. Here, we study whether enhancing women's dialogue skills helped prevent conflicts from arising or escalating. The index in column (4) aggregates women's reports of being subjected to either verbal or physical abuse by their partners. We find modest improvements in this index from all three training programs, which reduced the incidence of violent behavior by 0.066 to 0.070 SD compared to the control group. We cannot reject the null of equal impacts of WCommHN and WHN. (We note that this outcome seems especially prone to experimenter demand effects.)

Taken together, the findings in Table 1 indicate that the communication skills component of the WCommHN program equipped women with the tools to communicate more effectively with their partners, in their view, which led to improvements in marital relationships and increased the share of couples making decisions about the family's health and expenses together.

Finding 2: The communication intervention boosted spousal discussion about health and nutrition, but without knowledge spillovers to husbands.

Table 2 displays impacts on couples' discussion of targeted topics surrounding household health, nutrition, and budgeting. A key takeaway is that the communication-plus-health-skills intervention enhanced spousal dialogue more than the health training alone did. Column (5) shows that, while women in all three treatment groups reported more frequent discussions of targeted topics with their husbands than the control group, WCommHN had the largest impact: women's overall discussion index increased by 0.200 SD in WCommHN villages relative to the control, which is statistically larger than the 0.113 SD increase we find in WHN villages (p=0.024).

Breaking down this result, column (1) shows that all three treatments had comparable (positive) impacts on the frequency of spousal discussion around family planning. In contrast, columns (2) and (4) show that only WCommHN increased the share of women who discussed their and their partner's HIV statuses (by 5.5 percentage points, an 8.7% increase from the control mean) and the household's finances with their husband (by 6.9 percentage points, an 11% boost from the control mean). We can reject the null hypothesis of equal impacts between WCommHN and WHN for the household finance discussion outcome in column (4) (p=0.005), but not for HIV status discussion in column (2) (p=0.178). Column (3) shows the ASTE for an index based on three indicators: whether the husband very often makes suggestions about children's healthcare, whether the husband very often suggests types of foods to eat, and whether the couple very often discusses health and nutrition. Here, we cannot reject the null of equal effects between WHN and WCommHN (p=0.273).

Next we assess how much knowledge about child health and nutrition women and men gained from each intervention, including how much of the new information they passed on to their spouse. Column (6) shows that the health knowledge of women assigned to both WCommHN and WHN increased, by statistically similar amounts (roughly 0.4 SD, p=0.184). The results in column (7) are more surprising. The null effects in the first two rows point to an absence of knowledge spillovers on the husbands of women in both the WHN and WCommHN arms.[9] In particular, despite the finding that the women's communication training improved women's communication skills (Table 1) and increased the frequency of discussion of targeted topics with their husbands (Table 2, column 5), we do not detect any differential change in the health knowledge of men whose wives were assigned to the WCommHN arm. This suggests that women talked more about the family's health and nutrition with their partners but either without sharing their new knowledge or without their husbands retaining it. Recent evidence from other settings supports the latter interpretation. An experiment in

[9]In contrast, the statistically significant impact of the MHN trainings on *women's* health knowledge, by 0.122 SD, suggests that men assigned to health classes passed on at least some of their newly acquired knowledge to their wives. Björkman Nyqvist and Jayachandran (2017) discuss this asymmetry in information-sharing in their comparison of the MHN and WHN programs.

India shows that men's beliefs respond less than half as much to information discovered by their wives compared to when they directly receive it (Conlon et al. 2022).

Finding 3: No additional impact of the communication intervention on household health behaviors compared to women's health classes alone.

Table 3 reports treatment effects on three thematic indices of health-promoting behaviors and an aggregate index pooling all variables entering the three indices. Columns (1) and (2) focus on indices for infant health (e.g., breastfeeding duration, number of vaccinations) and maternal health (e.g., did mother eat more of certain foods during pregnancy), respectively. The outcome in column (3) is an index of household sanitary practices, such as handwashing before meals.

Column (4) shows that, while both the WCommHN and WHN programs significantly improved the overall household health behavior index – by 0.378 SD and 0.311 SD respectively – we cannot reject the null of equal impacts (p=0.141). We do not find evidence of a differential impact on adherence to guidelines around infant health (p=0.830), maternal health (p=0.652), or household sanitary practices (p=0.188). Thus, the increase in spousal discussion of targeted health topics induced by the communication skills treatment did not boost household adoption of this set of health-promoting behaviors more than the women's health classes alone did.[10] The effects of the WHN intervention are already quite large, perhaps because most of these outcomes are practices that women can plausibly implement without needing to negotiate much with their partners. This might have limited the potential for additional measurable impacts of the communication training.

Finding 4: The assertive communication training increased intake of animal-sourced foods, by raising household spending on meat and fish.

In Table 4, we report impacts on women's and children's consumption of the different food groups that the health curriculum flagged as essential components of a nutritious diet for young children and pregnant/breastfeeding women, emphasizing the importance of dietary diversity, specifically incorporating more protein, fruits, and vegetables into the typical heavily starch-based diet (Appendix B1). We estimate effects on intake of carbohydrates, fruit and vegetables, and animal-sourced foods. The latter is an important determinant of growth in the early years (Headey et al. 2018) and a key pathway through which social protection programs have been shown to reduce child stunting (Manley et al. 2020).[11] Our outcome variables combine children's and mothers'

[10] WCommHN and WHN both led to significantly larger improvements in adherence to health guidelines than MHN, an effect driven by behaviors related to newborn health (column (1)) and household sanitary practices (column (3)). This suggests that women were more likely than men to put into practice what they learned in the health classes.

[11] At baseline, 37% of children aged 0-28 months (the age range for which we collected anthropometrics) were stunted.

food intake, as maternal nutrition during pregnancy and breastfeeding was also a focus of the health curriculum.[12]

Panel A reports effects on women's and children's intake of these different food groups. Columns (1) and (3) do not show any additional impact of the communication training on consumption of carbohydrates or fruit and vegetables over the already positive effects of the WHN training. In contrast, column (2) shows that, in WCommHN villages, women and children increased their intake of animal-sourced foods by 0.134 SD compared to the control, an impact that is statistically larger than that of WHN alone (p=0.002). Appendix Figure A1 shows the shares of children consuming any animal-sourced foods at endline in each group: 21% in WCommHN households compared to 16% in WHN and control households and 18% in MHN households.

Panel B examines household spending on different food items as well as agricultural land allocation to fruit and vegetables.[13] Mirroring the patterns on food intake, we observe a significant expenditure increase on meat and fish in the WCommHN group only: the average household in WCommHN villages spent 226 Ugandan shillings (UGX) more on meat and fish per capita, 24% more than the control group. This is statistically larger than the effect of WHN (p=0.005). In contrast, we find that expenditure on rice (a carbohydrate) increased by similar magnitudes in both groups (p=0.271), and cultivation of fruit and vegetables increased in both arms, with a larger effect in the WHN arm (p=0.057).

The results in Table 4 suggest that women who participated in the communication training may have applied assertiveness skills to shift household spending towards animal-sourced foods. Indeed, since meat and fish must be purchased to be consumed and men control household finances, a plausible mechanism underlying this result is that women in WCommHN villages discussed the household's food budget with their husbands and convinced them to spend more on these items.[14]

Finding 5: No significant impacts on directly-measured child health outcomes.

Table 5 reports program impacts on child anthropometrics. In columns (1) and (2), we restrict the sample to children aged 23 months or younger at the start of the program – including babies born during the intervention. We focus on this age group because the growth-faltering effects of malnutrition are concentrated in the first 1000 days af-

[12]Linear growth faltering is largely determined by maternal nutrition during pregnancy and complementary feeding practices in the 6-24 months age range (Victora et al. 2010).

[13]We did not collect expenditures on fruit and vegetables because most households consume from their own production.

[14]Appendix B2 provides an extract from the communication curriculum illustrating the differences between passive, aggressive, and assertive communication with an example in which a woman's husband goes to the market but returns without the healthy food items that his wife requested. The training recommended the assertive response as the most effective way of convincing the husband to go back to the market and buy the healthy items while avoiding conflict.

ter conception (Victora et al. 2010). While the point estimate on weight-for-age (WFA) and height-for-age (HFA) is larger for WCommHN than WHN, the two effects are not statistically distinguishable (p=0.489 for WFA and p=0.512 for HFA).[15]

One interpretation of the null results for child anthropometrics is that the increase in health-promoting behaviors and nutrition observed for the WHN and WCommHN arms (Tables 3 and 4) was insufficient to impact child growth. Other health behavioral change programs that improved dietary diversity also failed to detect impacts on child anthropometrics (e.g., Premand and Barry 2022; Arikpo et al. 2018). The short interval between the intervention and the endline survey (4-9 months) might also be why we do not observe changes in anthropometrics. The benefits of dietary improvements for child growth may take longer to materialize, as height captures cumulative effects of nutrition in the first two years of life (Alderman and Headey 2018).

In contrast, we find statistically larger impacts of WCommHN, compared to WHN, on the birthweight of babies born after the start of the program (column (3)), an effect that might stem from better maternal nutrition during pregnancy. The effect size of 0.233 kilograms represents 38% of the control group standard deviation. Appendix Table A8 shows that the results are similar in the subsample where birthweight was read off the birth card and where it was reported by the mother. While this finding, if true, is important, we note that enumerator-measured anthropometrics were the study's primary child health outcomes.

The fact that many outcomes exhibiting differential impacts of WCommHN are self-reported may raise concerns about experimenter demand effects. However, there are at least three reasons to believe that the impacts are not purely artifacts of reporting. First, our final result that WCommHN improved birthweight, including for the subsample with weight read off the baby's birth card, is reassuring. Impacts on self-reported objective outcomes like food intake (collected through a 24-hour food recall module) and expenditure (reported as spending in the last 7 days) also seem less likely to be driven by misreporting. Second, the lack of an effect of the communications training on self-reported domestic violence – despite the communications skills being expressly framed as helping to reduce violence – lessens the demand effect concern. Third, program facilitators and enumerators were distinct, which should weaken respondents' incentive to report what facilitators wanted to hear. Overall, these arguments suggest that our findings capture a real shift in household decision-making and outcomes, albeit concentrated only around some dimensions of family health and nutrition.

[15] Appendix Table A8 shows similar patterns for children's middle-upper-arm-circumference and hemoglobin levels.

4 Conclusion

In this paper, we study whether providing assertive communication training to women can strengthen their influence over child health and nutrition investments through the channel of more effective dialogue with their husbands. Our results from an RCT in Uganda provide modest evidence in support of this hypothesis. They suggest that the addition of communication skills training, while effective at increasing spousal communication and women's satisfaction with their relationship, did not shift women's voice in household decisions sufficiently to generate downstream impacts on most child health outcomes. Nonetheless, households' consumption of animal-sourced foods increased as a result of the communication-plus-health-skills intervention, relative to health classes alone, which suggests that boosting mothers' assertive communication skills can enable them to affect change in household spending on, and intake of, more costly food items such as meat and fish. In addition, we observe higher birthweight of newborns, which we view as suggestive evidence that child health may have improved along some dimensions.

One interpretation of the program's modest impacts is that targeting only *women's* communication skills may not suffice to overcome preference misalignment between spouses if men and women exert control over separate spheres of household decision-making. Recent research on the asymmetric nature of information diffusion between husbands and wives highlights that we still have much to learn about the complexities of intra-household communication and information-sharing (Conlon et al. 2022; Fehr et al. 2022; Ashraf et al. 2022). Further, the fact that husbands of participants in the communication-plus-health-skills group reported only small improvements in their relationships and marital communication highlights the limitations of the program's unilateral approach. Offering parallel communication skills training for husbands and encouraging transparent and engaged spousal dialogue from both sides might be more effective. Despite being a costlier, more logistically challenging approach, this might also increase the number of decisions couples make jointly and, thereby, reduce spousal conflict. Exploring whether spousal communication training interventions targeting both men and women can have larger impacts on child health is a promising direction for future research.

References

Akresh, R., de Walque, D., and Kazianga, H. (2016). Evidence from a Randomized Evaluation of the Household Welfare Impacts of Conditional and Unconditional Cash Transfers Given to Mothers or Fathers. *World Bank Policy Research Working Paper No. 7730*.

Alderman, H. and Fernald, L. (2017). The Nexus Between Nutrition and Early Childhood Development. *Annual Review of Nutrition*, 37(1):447–476.

Alderman, H. and Headey, D. (2018). The Timing of Growth Faltering Has Important Implications for Observational Analyses of the Underlying Determinants of Nutrition Outcomes. *PLOS ONE*, 13(4):1–16.

Almås, I., Ringdal, C., and Sjursen, I. H. (2020). *Understanding Inequality Within Households*, pages 1–27. Springer International Publishing, Cham.

Ambler, K., Doss, C., Kieran, C., and Passarelli, S. (2021). He Says, She Says: Spousal Disagreement in Survey Measures of Bargaining Power. *Economic Development and Cultural Change*, 69(2):765–788.

Annan, J., Donald, A., Goldstein, M., Martinez, P. G., and Koolwal, G. (2021). Taking Power: Women's Empowerment and Household Well-Being in Sub-Saharan Africa. *World Development*, 140:105292.

Arikpo, D., Edet, E. S., Chibuzor, M. T., Odey, F., and Caldwell, D. M. (2018). Educational Interventions for Improving Primary Caregiver Complementary Feeding Practices for Children Aged 24 Months and Under. *Cochrane Database Syst Rev*, 5(5):CD011768.

Armand, A., Attanasio, O., Carneiro, P., and Lechene, V. (2020). The Effect of Gender-Targeted Conditional Cash Transfers on Household Expenditures: Evidence from a Randomized Experiment. *Economic Journal*, 130(631):1875–1897.

Ashraf, N., Bau, N., Low, C., and McGinn, K. (2020). Negotiating a Better Future: How Interpersonal Skills Facilitate Intergenerational Investment. *Quarterly Journal of Economics*, 135(2):1095–1151.

Ashraf, N., Field, E., Voena, A., and Ziparo, R. (2022). Gendered Spheres of Learning and Household Decision Making over Fertility. *Stanford Working Paper*.

Bhutta, Z. A., Das, J. K., Rizvi, A., Gaffey, M. F., Walker, N., Horton, S., Webb, P., Lartey, A., Black, R. E., Group, T. L. N. I. R., et al. (2014). Evidence-Based Interventions for Improvement of Maternal and Child Nutrition: What Can Be Done and at What Cost? *Lancet*, 382(9890):452–477.

Björkman Nyqvist, M. and Jayachandran, S. (2017). Mothers Care More, but Fathers Decide: Educating Parents about Child Health in Uganda. *American Economic Review Papers and Proceedings*, 107(5):496–500.

Bourgault, S. and O'Donnell, M. (2020). Women's Access to Cash Transfers in Light of COVID-19: The Case of Pakistan. *CGD Note June 2020. Center for Global Development*.

Conlon, J. J., Mani, M., Rao, G., Ridley, M., and Schilbach, F. (2022). Learning in the Household. *MIT Working Paper*.

Dizon-Ross, R. and Jayachandran, S. (2023). Detecting Mother-Father Differences in Spending on Children: A New Approach Using Willingness-to-Pay Elicitation. *American Economic Review: Insights*, 5(4):445–59.

Donald, A., Doss, C., Goldstein, M., and Gupta, S. (2023). Sharing Responsibility through Joint Decision-making and Implications for Intimate-Partner Violence: Evidence from 12 Sub-Saharan African Countries. *Review of Economics of the Household*.

Duflo, E. (2003). Grandmothers and Granddaughters: Old-Age Pensions and Intrahousehold Allocation in South Africa. *World Bank Economic Review*, 17(1):1–25.

Duflo, E., Glennerster, R., and Kremer, M. (2007). Using Randomization in Development Economics Research: A Toolkit. *Handbook of Development Economics*, 4:3895–3962.

Fehr, D., Mollerstrom, J., and Perez-Truglia, R. (2022). Listen to Her: Gender Differences in Information Diffusion Within the Household. *NBER Working Paper 30513*.

Fiszbein, A., Schady, N., Ferreira, F. H., Grosh, M., Keleher, N., Olinto, P., and Skoufias, E. (2009). Conditional Cash Transfers: Reducing Present and Future Poverty. World Bank Policy Research Report. Washington, DC: World Bank.

Fitzsimons, E., Malde, B., Mesnard, A., and Vera-Hernández, M. (2016). Nutrition, Information and Household Behavior: Experimental Evidence From Malawi. *Journal of Development Economics*, 122:113–126.

Headey, D., Hirvonen, K., and Hoddinott, J. (2018). Animal Sourced Foods and Child Stunting. *American Journal of Agricultural Economics*, 100(5):1302–1319.

ICF (2011). [Accessed 2022, May 16, 2023]. The DHS Program STATcompiler. http://www.statcompiler.com. Funded by USAID.

IGME (2013). Levels Trend in Child Mortality: Estimates Developed by the Un Inter-Agency Group for Child Mortality Estimation.

IGME (2020). Levels Trend in Child Mortality: Estimates Developed by the UN Inter-Agency Group for Child Mortality Estimation.

Kling, J. R., Liebman, J. B., and Katz, L. F. (2007). Experimental Analysis of Neighborhood Effects. *Econometrica*, 75(1):83–119.

Lee, D. S. (2009). Training, Wages, and Sample Selection: Estimating Sharp Bounds on Treatment Effects. *The Review of Economic Studies*, 76(3):1071–1102.

Manley, J., Balarajan, Y., Malm, S., Harman, L., Owens, J., Murthy, S., Stewart, D., Winder-Rossi, N., and Khurshid, A. (2020). Cash transfers and child nutritional outcomes: a systematic review and meta-analysis. *BMJ Global Health*, 5(12):e003621.

Menon, N., van der Meulen Rodgers, Y., and Nguyen, H. (2014). Women's Land Rights and Children's Human Capital in Vietnam. *World Development*, 54:18–31.

Premand, P. and Barry, O. (2022). Behavioral change promotion, cash transfers and early childhood development: Experimental evidence from a government program in a low-income setting. *Journal of Development Economics*, 158:102921.

Qian, N. (2008). Missing Women and the Price of Tea in China: The Effect of Sex-Specific Earnings on Sex Imbalance. *Quarterly Journal of Economics*, 123(3):1251–1285.

Sitefane, G. G., Banerjee, J., Mohan, D., Lee, C. S., Ricca, J., Betron, M. L., and Cuco, R. M. M. (2020). Do Male Engagement and Couples' Communication Influence Maternal Health Care-Seeking? Findings From a Household Survey in Mozambique. *BMC Pregnancy and Childbirth*.

Thomas, D. (1990). Intra-Household Resource Allocation: An Inferential Approach. *Journal of Human Resources*, 25(4):635–664.

Thomas, D. (1997). Incomes, Expenditures, and Health Outcomes: Evidence on Intrahousehold Resource Allocation. *Intrahousehold resource allocation in developing countries*, pages 142–64.

UNICEF (2020). Levels and Trends in Child Malnutrition: Key Findings of the 2020 Edition of the Joint Child Malnutrition Estimates. Geneva: World Health Organization. *United Nations Children's Fund (UNICEF), World Health Organization, International Bank for Reconstruction and Development/The World Bank.*

Victora, C. G., de Onis, M., Hallal, P. C., Blössner, M., and Shrimpton, R. (2010). Worldwide Timing of Growth Faltering: Revisiting Implications for Interventions. *Pediatrics*, 125(3):e473–e480.

Table 1: Program impacts on effective communication between spouses.

	(1)	(2)	(3)	(4)
	Relationship improved ASTE	Wife part of household decisions ASTE	Couple makes decisions together ASTE	Husband is less violent ASTE
WCommHN	0.210***	0.107**	0.143***	0.069*
	[0.045]	[0.043]	[0.048]	[0.037]
WHN	0.045	0.052	0.030	0.070*
	[0.041]	[0.042]	[0.043]	[0.036]
MHN	0.042	0.071*	0.086**	0.066*
	[0.039]	[0.040]	[0.043]	[0.037]
Control mean of outcome	-0.000	-0.000	-0.000	-0.000
	(1.000)	(1.000)	(1.000)	(1.001)
p-value: WCommHN=WHN	0.000	0.204	0.013	0.977
p-value: WCommHN=MHN	0.000	0.375	0.212	0.929
p-value: WHN=MHN	0.939	0.649	0.158	0.903
Observations	5,177	5,283	5,283	5,183

Note: * p<0.1, ** p<0.05, *** p<0.01. Standard errors clustered at the village level in brackets. All specifications control for stratum and district fixed effects. Whenever the outcome variable was collected at baseline, we also control for the baseline value of the outcome (columns (2), (3), and (4)). The p-values show the results of the test of the null hypothesis of equal treatment effects between the different intervention arms. We report the Control group standard deviation of the outcome variable underneath the Control mean in parentheses. Column (1) shows the ASTE of pooling all outcomes collected at endline on whether the relationship improved along the following dimensions: husband listens more to wife; wife listens more to husband; husband and wife share more information; husband and wife have fewer arguments; husband is more involved with the family; husband is more likely to share household finances with wife. Column (2) shows the ASTE of the following binary outcomes: woman has a say in: daily household needs; major household purchases; whether to save or spend household money; buying women's clothing; children's health costs; what and how much to feed the children; expenses for children's schooling (including uniforms); buying clothes for the children; how to spend her earnings. Column (3) shows the joint decision-making ASTE, constructed from the same set of questions as column (2), but where each indicator entering the index is equal to 1 if the couple makes the decision together, and 0 otherwise. Column (4) shows the ASTE of the following measures of husband's violent behavior towards his wife in the past year: humiliated her in front of others; threatened her; insulted her; beat her; pushed her; slapped her; was violent in other ways. Appendix Tables A5a, A5b, A5c and A5d report treatment effects on each outcome entering the ASTE in columns (1), (2), (3) and (4) respectively. Appendix Table A4a reports treatment effects on men's perceptions of the outcomes entering columns (1)-(3) that are included in the men's survey. Appendix Table A4b reports treatment effects on a binary indicator equal to 1 if both spouses' reports agree that the woman has a say in decisions (column (2)) or that decisions are made jointly (column (3)), and 0 otherwise.

Table 2: Program impacts on frequency of spousal discussion about targeted health topics and women's and men's health knowledge.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Discusses family planning with spouse	Discusses HIV with spouse	Health and nutrition discussion ASTE	Discusses HH finance with spouse	Overall discussion ASTE	Health knowledge ASTE (Woman)	Health knowledge ASTE (Man)
WCommHN	0.035***	0.055**	0.148***	0.069***	0.200***	0.404***	0.022
	[0.010]	[0.024]	[0.044]	[0.021]	[0.043]	[0.043]	[0.041]
WHN	0.026**	0.026	0.101**	0.015	0.113***	0.350***	0.053
	[0.011]	[0.022]	[0.044]	[0.020]	[0.041]	[0.040]	[0.043]
MHN	0.028***	0.016	0.079*	0.016	0.090**	0.120***	0.305***
	[0.011]	[0.023]	[0.042]	[0.020]	[0.042]	[0.043]	[0.043]
Control mean of outcome	0.906	0.635	0.000	0.626	0.000	0.190	-0.190
	(0.292)	(0.482)	(1.000)	(0.484)	(1.000)	(0.986)	(0.969)
p-value: WCommHN=WHN	0.377	0.178	0.273	0.005	0.024	0.184	0.478
p-value: WCommHN=MHN	0.506	0.091	0.104	0.005	0.005	0.000	0.000
p-value: WHN=MHN	0.831	0.637	0.603	0.941	0.527	0.000	0.000
Observations	5,163	5,191	5,191	5,184	5,190	5,287	5,058

Note: * p<0.1, ** p<0.05, *** p<0.01. Standard errors clustered at the village level in brackets. All specifications control for stratum and district fixed effects. Whenever the outcome variable was collected at baseline, we also control for the baseline value of the outcome (columns (1), (4), (5), (6) and (7)). (Note that the baseline index is constructed from a subset of the list of questions asked at endline, as fewer of the outcomes used to derive the ASTE in (5), (6) and (7) were collected at baseline.) The p-values show the results of the test of the null hypothesis of equal treatment effects between the different intervention arms. We report the Control group standard deviation of the outcome variable underneath the Control mean in parentheses. Column (3), Health and Nutrition discussion ASTE: Very often discusses health and nutrition with spouse; Husband very often suggests types of food to eat; Husband very often makes suggestions about children's health care. Column (5): ASTE of all outcomes in columns (1), (2) and (4) + the 3 outcomes making up the ASTE in column (3). Column (6) and (7) show the ASTE of health knowledge outcomes (collected from female and male respondents respectively) as follows: Colostrum important for immunity/growth; Should introduce other liquid than breast milk at 6 months; Should introduce other food at 6 months; Lack of balanced diet impacts child growth; Babies should be breastfed for 24 months; Children should be dewormed every 6 months; Worms can contribute to anemia & malaria; Give ORS if child is vomitting or has diarrhea; Boys and girls of same age should both eat as much meat; Pregnant women with no pregnancy complications should still go to a hospital rather than a primary health center; Animal protein is not less important for women; Which foods are best to eat if you have anemia; Water needs to be boiled for several minutes to make it clean; Male condoms can only be used once; Poor hygiene can impact child's intelligence; Correctly identify healthier food plate for adult. Treatment effects on the components of the Health and Nutrition Discussion ASTE (column (3)) and the Health Knowledge ASTE (columns (6) and (7)) are reported in Appendix Tables A6a and A6b, respectively. In columns (6) and (7), the knowledge ASTE is defined over the entire sample (men + women), i.e. the same weights are used to construct the knowledge index for women and men so that the variables are directly comparable.

Table 3: Program impacts on household health behaviors.

	(1)	(2)	(3)	(4)
	Newborn health ASTE	Maternal health ASTE	Sanitary practices ASTE	Overall health ASTE
WCommHN	0.175***	0.153***	0.335***	0.378***
	[0.047]	[0.052]	[0.047]	[0.046]
WHN	0.168***	0.176***	0.274***	0.311***
	[0.047]	[0.052]	[0.047]	[0.044]
MHN	0.093*	0.178***	0.116***	0.157***
	[0.051]	[0.049]	[0.044]	[0.043]
Control mean of outcome	0.013	-0.030	0.000	-0.000
	(0.942)	(1.016)	(1.000)	(1.000)
p-value: WCommHN=WHN	0.830	0.652	0.188	0.141
p-value: WCommHN=MHN	0.037	0.599	0.000	0.000
p-value: WHN=MHN	0.067	0.969	0.000	0.000
Observations	3,035	3,432	5,384	5,384

Note: * p<0.1, ** p<0.05, *** p<0.01. Standard errors clustered at the village level in brackets. All specifications control for stratum and district fixed effects as well as for the baseline values of each index. The p-values show the results of the test of the null hypothesis of equal treatment effects between the different intervention arms. We report the Control group standard deviation of the outcome variable underneath the Control mean in parentheses. Newborn health and maternal health outcomes were only collected in the women's surveys and restricted to the latest birth or pregnancy in the last two years. Column (1), Newborn health ASTE: Baby's first health check timing below median of control group; Baby was ever breastfed; Time after birth tried breastfeeding below median; Did baby receive colostrum at birth; Mother ate more when breastfeeding; Was baby given any other liquids than breast milk in first week; Was baby given any other liquids in first 3 months; Was baby given any solid or semi-solid food in the first 3 months; Total number of vaccinations given; Vitamin A was given to baby in the first 6 weeks; Vitamin A was given to baby in the last 6 months. Column (2), Maternal health ASTE: Received antenatal care during latest pregnancy; Ate more of certain foods during last pregnancy; Iron was administered during pregnancy. Column (3), Sanitary practices ASTE: Men wash hands after going to the toilet; Men wash hands before a meal; Women wash hands after going to the toilet; Women wash hands before a meal; How often sweep latrine each week; Made improvements to latrine over the last 12 months; Treat drinking water. In column (4), the Overall health ASTE pools together all outcomes used to construct the ASTE indices in columns (1), (2) and (3). Treatment effects on the components of each ASTE are reported in Appendix Table A7.

Table 4: Program impacts on women's and children's nutrition.

	(1)	(2)	(3)
	Panel A: Food Intake (Women and Children)		
	Carbohydrates ASTE	Animal-sourced foods ASTE	Fruit & veg ASTE
WCommHN	0.140***	0.134***	0.168***
	[0.046]	[0.050]	[0.047]
WHN	0.117**	-0.016	0.165***
	[0.047]	[0.049]	[0.044]
MHN	-0.015	0.026	-0.029
	[0.049]	[0.049]	[0.043]
Control mean of outcome	-0.001	-0.003	-0.000
	(1.000)	(0.996)	(1.000)
p-value: WCommHN=WHN	0.589	0.002	0.937
p-value: WCommHN=MHN	0.001	0.027	0.000
p-value: WHN=MHN	0.004	0.370	0.000
Observations	5,286	5,286	5,286
	Panel B: Food Expenditure and Crop Allocation		
	Rice exp pc	Meat/fish exp pc	Grows more fruit/veg
WCommHN	53.796***	225.954***	0.073***
	[18.281]	[68.527]	[0.017]
WHN	32.905*	38.054	0.108***
	[17.426]	[67.497]	[0.017]
MHN	23.442	25.572	0.028*
	[18.705]	[65.628]	[0.016]
Control mean of outcome	145.052	930.655	0.136
	(379.472)	(1282.594)	(0.343)
p-value: WCommHN=WHN	0.271	0.005	0.057
p-value: WCommHN=MHN	0.133	0.002	0.010
p-value: WHN=MHN	0.627	0.843	0.000
Observations	4,970	4,937	5,227

Note: * p<0.1, ** p<0.05, *** p<0.01. Standard errors clustered at the village level in brackets. All specifications control for stratum and district fixed effects as well as baseline values of each outcome, except in Panel B, column (3). The p-values show the results of the test of the null hypothesis of equal treatment effects between the different intervention arms. We report the Control group standard deviation of the outcome variable underneath the Control mean in parentheses. Panel A: all outcomes are ASTEs of binary indicators for women's and children's food intake over the past 7 days. Carbohydrates: matooke, roots, grains; Animal-sourced foods: organ meats, meats, fish, eggs; Fruit and vegetables: dark leafy greens, pumpkin, other fruit and vegetables. Panel B: Columns (1) and (2) are household expenditure per capita outcomes where each child is weighted 0.5 and each adult is weighted 1 in the average. We trim the top 1% of values for each outcome. Column (3) is a binary indicator equal to 1 if women report that their household has been growing more fruit and vegetables over the past 12 months.

Table 5: Program impacts on child health outcomes.

	(1)	(2)	(3)
	Weight-for-age Z-score	Height-for-age Z-score	Birth weight (KGs)
WCommHN	0.031	0.028	0.233***
	[0.046]	[0.054]	[0.070]
WHN	-0.003	-0.010	0.036
	[0.049]	[0.053]	[0.068]
MHN	0.044	-0.002	0.005
	[0.047]	[0.053]	[0.070]
Control mean of outcome	-0.535	-1.538	3.294
	(1.148)	(1.377)	(0.614)
p-value: WCommHN=WHN	0.489	0.512	0.002
p-value: WCommHN=MHN	0.777	0.607	0.001
p-value: WHN=MHN	0.346	0.894	0.623
Observations	5,985	5,939	718

Note: * p<0.1, ** p<0.05, *** p<0.01. Standard errors clustered at the village level in brackets. All specifications control for stratum, district and monthXyear-of-birth fixed effects, as well as the child's gender. The p-values show the results of the test of the null hypothesis of equal treatment effects between the different intervention arms. We report the Control group standard deviation of the outcome variable underneath the Control mean in parentheses. In columns (1) and (2), the sample is all children aged 23 months or less at the start of the training programs in February 2013, who were 42 months or younger at endline. This includes new babies born between the start of the intervention and the endline survey. Columns (1) and (2) also control for age-in-months-at-endline dummies to account for non-linearities in child growth between conception and 24 months of age. In column (2) we also control for a dummy equal to 1 if the child was measured standing up (as opposed to lying down). Column (3) reports program impacts on the birthweight of babies born after the start of the intervention, controlling for a dummy indicator equal to 1 if the weight was read off the child's birth card. We trim the top 5% of values of this outcome (all of which are $>$ 5KG). Appendix Table A8 reports effects on two additional anthropometric measures (children's middle-upper-arm-circumference and hemoglobin levels) as well as impacts on birthweight separately for the subsample where weight was read off the baby's birth card and where it was self-reported by the mother.

Appendix A: Additional Tables and Figures

Table A1: Balance Checks.

	Control		WCommHN		WHN		MHN		WCommHN - WHN	N
	Mean	SD	Coeff.	SE	Coeff.	SE	Coeff.	SE	*p*-value	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Woman's age	27.635	6.523	0.120	(0.268)	0.383	(0.261)	0.028	(0.257)	0.283	5505
Woman's years of education	5.200	3.000	0.091	(0.156)	-0.075	(0.152)	-0.036	(0.156)	0.273	5339
Number of children under 5 years old	1.640	0.692	-0.002	(0.029)	0.015	(0.028)	-0.012	(0.029)	0.533	5332
Woman earns income	0.796	0.403	-0.019	(0.022)	-0.016	(0.021)	0.007	(0.020)	0.910	5467
Wife part of household decisions ASTE (Woman)	0.000	1.000	0.027	(0.044)	0.065	(0.044)	0.029	(0.045)	0.367	5511
Couple makes decisions together ASTE (Woman)	0.000	1.000	-0.046	(0.053)	-0.050	(0.055)	0.035	(0.056)	0.948	5507
Husband's violent behavior ASTE	0.000	1.000	0.009	(0.042)	0.035	(0.038)	0.042	(0.040)	0.523	5505
Woman's Overall Discussion ASTE	0.000	1.000	-0.017	(0.042)	0.026	(0.040)	0.037	(0.037)	0.287	5511
Woman's Health Knowledge ASTE	0.000	1.000	-0.048	(0.045)	-0.033	(0.043)	-0.018	(0.045)	0.713	5512
Man's Health Knowledge ASTE	0.000	1.000	-0.051	(0.047)	0.043	(0.047)	0.019	(0.050)	0.025	5512
Household Sanitary Practices ASTE	0.000	1.000	0.038	(0.054)	0.055	(0.053)	-0.008	(0.056)	0.756	5512
Newborn Health ASTE	0.000	1.000	0.034	(0.045)	-0.051	(0.050)	-0.023	(0.050)	0.072	4968
Maternal Health ASTE	0.000	1.000	-0.026	(0.043)	0.039	(0.037)	0.039	(0.040)	0.119	4964
Carbohydrates ASTE	0.000	1.000	-0.006	(0.048)	-0.069	(0.050)	-0.080*	(0.048)	0.202	5510
Animal-sourced foods ASTE	0.000	1.000	0.066	(0.053)	0.026	(0.044)	0.026	(0.049)	0.445	5510
Fruit and vegetables ASTE	0.000	1.000	-0.037	(0.046)	-0.039	(0.046)	-0.154***	(0.047)	0.975	5510
Per capita spending on rice, last 7 days (UGX)	5.823	17.233	1.145	(0.823)	0.752	(0.840)	1.314	(0.855)	0.663	5505
Per capita spending on meat/fish, last 7 days (UGX)	584.026	1202.445	57.544	(59.499)	47.676	(53.733)	86.370	(53.155)	0.870	5505
Birthweight of last-born baby (KG)	3.325	0.457	-0.014	(0.019)	-0.009	(0.017)	0.012	(0.018)	0.776	5512
Child's weight-for-age Z-score	-0.247	1.278	-0.020	(0.059)	0.026	(0.055)	-0.008	(0.057)	0.396	5482
Child's height-for-age Z-score	-1.383	1.797	-0.002	(0.102)	0.031	(0.097)	-0.088	(0.099)	0.735	5482
Child's MUAC-for-age Z-score	0.001	1.056	-0.018	(0.066)	-0.049	(0.061)	0.050	(0.061)	0.627	5482
Child's hemoglobin level (g/dl)	11.309	1.425	-0.106	(0.069)	-0.022	(0.070)	-0.081	(0.069)	0.237	5482
P-value of joint F-test			0.823		0.155		0.130		0.182	

Note: * p<0.1, ** p<0.05, *** p<0.01. Columns (1) and (2) show the summary statistics for the control group at baseline. Columns (3), (5) and (7) display the coefficient estimates from regressing the baseline variable on three treatment dummies (taking value 1 if the respondent was randomly assigned to the WCommHN, WHN, or MHN group, respectively). Standard errors clustered at the village level are reported in columns (4), (6) and (8). All specifications control for stratum and district fixed effects. The last row of the table reports the p-values of different joint significance tests. In columns (3), (5), and (7), the null hypothesis is that the coefficient of the treatment dummy (WCommHN, WHN, and MHN, respectively) is 0 for all outcomes. In column (9), the null hypothesis is that the coefficient of the WCommHN dummy is equal to that of the WHN dummy in all regressions. Column (9) reports the p-values of the test of the null hypothesis of equal effects of the WHN and WCommHN treatment arms for each outcome separately. Column (10) displays the number of non-missing household or child-level (for the anthropometric outcomes in the last four rows) observations in the baseline survey out of a sample of 5512 households. Most outcomes capture baseline characteristics of the female respondent in the household, except for the following: Man's Health Knowledge ASTE, where the sample is the number of male partners present at the time of the baseline interview; Newborn Health ASTE and Maternal Health ASTE, where the sample is restricted to women who gave birth in the last two years or are currently pregnant; Child's anthropometrics and hemoglobin levels, for which the sample is all children aged 0-28 months at baseline. "Birthweight of last-born baby" applies to women who had a live birth in the two years preceding the baseline survey. We trim the top 5% of values of this outcome (all of which are $>$ 5KG), as we do for the endline version of this variable in Table 5. We impute all missing values of this outcome with the sample mean and control for a dummy variable equal to 1 if the value was imputed. All ASTEs are the baseline counterparts to the endline ASTEs in Tables 1-4.

Table A2a: Sample attrition by treatment arm.

	Still in sample	
	Woman (1)	Child anthropometrics (2)
WCommHN	0.004	-0.002
	[0.008]	[0.010]
WHN	0.007	0.003
	[0.007]	[0.009]
MHN	-0.003	-0.003
	[0.008]	[0.009]
Control mean of outcome	0.964	0.948
	(0.185)	(0.223)
p-value: WCommHN=WHN	0.733	0.581
p-value: WCommHN=MHN	0.371	0.942
p-value: WHN=MHN	0.184	0.493
Observations	5,512	5,512

Note: * p<0.1, ** p<0.05, *** p<0.01. Standard errors clustered at the village level in brackets. The outcome is a binary variable equal to 1 if the baseline household was surveyed in the endline in column (1) and whether child anthropometric measurements were collected at endline in column (2). We report the Control group standard deviation of the outcome variable underneath the Control mean in parentheses. The p-values reported below the Control mean show the results of the test of the null hypothesis of equal effects between the different intervention arms. All specifications control for stratum and district fixed effects.

Table A2b: Heterogeneity of attrition from the endline survey by baseline characteristics.

	Still in sample: Woman						Still in sample: Child anthropometrics					
	WCommHN vs. WHN		WHN vs. Control		WCommHN vs. Control		WCommHN vs. WHN		WHN vs. Control		WCommHN vs. Control	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
WCommHN	-0.003	0.038			0.004	-0.020	-0.006	0.014			-0.002	-0.102
	[0.007]	[0.101]			[0.008]	[0.109]	[0.010]	[0.116]			[0.010]	[0.116]
WHN			0.007	-0.061					0.003	-0.121		
			[0.007]	[0.098]					[0.009]	[0.114]		
Treatment arm interacted with:												
Woman's age		-0.001		-0.000		-0.001		0.001		-0.001		-0.001
		[0.001]		[0.001]		[0.001]		[0.002]		[0.001]		[0.002]
Woman's years of education		-0.005*		0.002		-0.002		-0.003		0.001		-0.002
		[0.002]		[0.003]		[0.003]		[0.003]		[0.004]		[0.004]
Number of children under 5 years old		0.012		0.001		0.013		0.012		0.004		0.016
		[0.010]		[0.011]		[0.012]		[0.011]		[0.012]		[0.013]
Woman earns income		0.023		-0.014		0.008		-0.002		-0.005		-0.010
		[0.018]		[0.019]		[0.022]		[0.021]		[0.023]		[0.025]
Woman part of HH decisions ASTE		0.002		-0.006		-0.004		0.013		-0.017*		-0.004
		[0.009]		[0.009]		[0.010]		[0.011]		[0.009]		[0.012]
Couple makes decisions together ASTE		0.012		-0.004		0.008		0.011		0.006		0.018*
		[0.009]		[0.009]		[0.009]		[0.012]		[0.012]		[0.010]
Husband's violent behavior ASTE		0.016**		-0.005		0.011		0.019*		-0.005		0.014
		[0.007]		[0.006]		[0.008]		[0.010]		[0.008]		[0.011]
Woman's overall discussion ASTE		0.007		-0.011		-0.004		0.005		-0.014		-0.009
		[0.008]		[0.007]		[0.009]		[0.009]		[0.009]		[0.010]
Woman's knowledge index ASTE		0.001		-0.002		-0.000		0.004		-0.004		-0.000
		[0.007]		[0.007]		[0.008]		[0.009]		[0.009]		[0.010]
Man's knowledge index ASTE		-0.009		0.008		-0.001		-0.023**		0.016		-0.008
		[0.009]		[0.007]		[0.009]		[0.010]		[0.010]		[0.010]
Household Sanitary Practices ASTE		-0.017**		0.004		-0.012		-0.016		0.011		-0.003
		[0.008]		[0.007]		[0.008]		[0.011]		[0.009]		[0.011]
Newborn Health ASTE		0.005		0.003		0.008		0.005		-0.007		-0.000
		[0.007]		[0.006]		[0.008]		[0.009]		[0.011]		[0.013]
Maternal Health ASTE		-0.008		0.004		-0.004		-0.008		0.006		-0.002
		[0.005]		[0.007]		[0.007]		[0.007]		[0.008]		[0.008]
Carbohydrates ASTE		-0.008		-0.005		-0.013*		-0.010		-0.002		-0.013
		[0.007]		[0.008]		[0.007]		[0.010]		[0.008]		[0.010]
Animal-sourced foods ASTE		0.014*		-0.016*		-0.002		0.011		-0.016*		-0.004
		[0.007]		[0.009]		[0.007]		[0.009]		[0.009]		[0.008]
Fruit and vegetables ASTE		0.009		0.000		0.009		0.002		0.003		0.004
		[0.008]		[0.007]		[0.009]		[0.009]		[0.008]		[0.010]
Per capita spending on rice, last 7 days (UGX)		-0.000		0.000		0.000		-0.000		0.001*		0.000
		[0.000]		[0.000]		[0.000]		[0.000]		[0.000]		[0.000]
Per capita spending on meat/fish, last 7 days (UGX)		0.000		0.000		0.000		0.000		0.000		0.000
		[0.000]		[0.000]		[0.000]		[0.000]		[0.000]		[0.000]
Birthweight of last-born baby (KG)		0.006		0.011		0.017		-0.003		0.031*		0.028
		[0.016]		[0.012]		[0.016]		[0.018]		[0.017]		[0.020]
Average child's weight-for-age Z-score		0.004		0.012		0.016		-0.006		0.017		0.011
		[0.010]		[0.009]		[0.012]		[0.013]		[0.011]		[0.015]
Average child's height-for-age Z-score		-0.002		-0.004		-0.007		-0.003		-0.004		-0.009
		[0.006]		[0.006]		[0.007]		[0.008]		[0.006]		[0.008]
Average child's MUAC-for-age Z-score		0.008		-0.023**		-0.014		0.021*		-0.023**		-0.001
		[0.009]		[0.010]		[0.011]		[0.011]		[0.010]		[0.013]
Average child's hemoglobin level (g/dl)		-0.004		0.001		-0.003		-0.003		0.002		-0.001
		[0.005]		[0.005]		[0.006]		[0.005]		[0.006]		[0.006]
Outcome mean, omitted group	0.964	0.975	0.957	0.968	0.957	0.968	0.948	0.962	0.944	0.954	0.944	0.954
p-value: joint test		0.092		0.523		0.651		0.187		0.162		0.398
Observations	2,765	2,283	2,814	2,336	2,709	2,205	2,765	2,283	2,814	2,336	2,709	2,205

Note: * p<0.1, ** p<0.05, *** p<0.01. Standard errors clustered at the village level in brackets. This table reports the results of pairwise comparison tests of differential attrition. The odd columns report the results of regressing an outcome equal to 1 if the baseline household was surveyed at endline on the relevant treatment arm dummy (as in Appendix Table A2a but restricting the sample to the pair of treatment/control arms listed in the column headers). In the even columns we also interact the relevant treatment dummy (i.e. WCommHN in columns (2), (6), (8) and (12) and WHN in columns (4) and (10)) with the same list of baseline outcomes as the one used for the balance checks in Table A1. The p-value at the bottom of the table reports the result of the test of the null hypothesis that all interaction term coefficients are 0 in each pairwise specification. All specifications control for stratum and district fixed effects, as well as the main term of all baseline outcomes in the interactions. Since we impute all missing values of the "Birthweight of last-born baby" variable with the sample mean of this outcome, we also control for a dummy variable equal to 1 (main term + interaction) if the value was imputed.

Table A3a: Program impacts on effective communication between spouses: Lee bounds.

	Relationship improved ASTE (1)	Wife part of household decisions ASTE (2)	Couple makes decisions together ASTE (3)	Husband is less violent ASTE (4)
	WCommHN vs. Control			
WCommHN (Lower bound)	0.207***	0.103**	0.133***	0.069*
	[0.045]	[0.043]	[0.048]	[0.037]
WCommHN (Upper bound)	0.211***	0.120***	0.149***	0.073**
	[0.045]	[0.042]	[0.048]	[0.036]
WCommHN missing rate	0.062	0.039	0.039	0.060
Control missing rate	0.064	0.043	0.043	0.061
	WCommHN vs. WHN			
WCommHN (Lower bound)	0.156***	0.046	0.111**	-0.040
	[0.045]	[0.041]	[0.045]	[0.031]
WCommHN (Upper bound)	0.192***	0.061	0.125***	0.004
	[0.044]	[0.042]	[0.044]	[0.033]
WCommHN missing rate	0.062	0.039	0.039	0.060
WHN missing rate	0.051	0.036	0.036	0.049

Note: * p<0.1, ** p<0.05, *** p<0.01. Standard errors clustered at the village level in brackets. The outcomes and specifications used to produce these estimates are the same as those presented in Table 1. The Lee bounds reported in the top panel correspond to the estimate of WCommHN treatment effects with respect to the Control group. The Lee bounds reported in the bottom panel correspond to the estimate of WCommHN treatment effects with respect to the WHN group.

Table A3b: Program impacts on frequency of spousal discussion about targeted health topics and women's and men's health knowledge: Lee bounds.

	Discusses family planning with spouse (1)	Discusses HIV with spouse (2)	Health and nutrition discussion ASTE (3)	Discusses HH finance with spouse (4)	Overall discussion ASTE (5)	Health knowledge ASTE (Woman) (6)	Health knowledge ASTE (Man) (7)
	WCommHN vs. Control						
WCommHN (Lower bound)	0.034***	0.056**	0.146***	0.069***	0.199***	0.398***	-0.005
	[0.010]	[0.024]	[0.044]	[0.020]	[0.042]	[0.042]	[0.040]
WCommHN (Upper bound)	0.035***	0.057**	0.148***	0.070***	0.202***	0.417***	0.058
	[0.010]	[0.024]	[0.044]	[0.021]	[0.043]	[0.042]	[0.041]
WCommHN missing rate	0.064	0.060	0.060	0.060	0.060	0.039	0.055
Control missing rate	0.065	0.061	0.061	0.061	0.061	0.043	0.066
	WCommHN vs. WHN						
WCommHN (Lower bound)	-0.005	0.020	0.028	0.049**	0.056	0.042	-0.051
	[0.009]	[0.021]	[0.043]	[0.019]	[0.038]	[0.040]	[0.041]
WCommHN (Upper bound)	0.009	0.033	0.060	0.060***	0.098***	0.063	-0.014
	[0.009]	[0.021]	[0.043]	[0.019]	[0.037]	[0.040]	[0.042]
WCommHN missing rate	0.064	0.060	0.060	0.060	0.060	0.039	0.055
WHN missing rate	0.051	0.048	0.048	0.048	0.048	0.036	0.049

Note: * p<0.1, ** p<0.05, *** p<0.01. Standard errors clustered at the village level in brackets. The outcomes and specifications used to produce these estimates are the same as those presented in Table 2. The Lee bounds reported in the top panel correspond to the estimate of WCommHN treatment effects with respect to the Control group. The Lee bounds reported in the bottom panel correspond to the estimate of WCommHN treatment effects with respect to the WHN group.

Table A3c: Program impacts on household health behaviors: Lee bounds.

	Newborn health ASTE (1)	Maternal health ASTE (2)	Sanitary practices ASTE (3)	Overall health ASTE (4)
	WCommHN vs. Control			
WCommHN (Lower bound)	0.080***	0.104**	0.317***	0.354***
	[0.030]	[0.050]	[0.045]	[0.044]
WCommHN (Upper bound)	0.204***	0.165***	0.362***	0.409***
	[0.047]	[0.052]	[0.046]	[0.046]
WCommHN missing rate	0.389	0.311	0.018	0.018
Control missing rate	0.374	0.302	0.028	0.028
	WCommHN vs. WHN			
WCommHN (Lower bound)	-0.041	-0.069	0.057	0.062
	[0.031]	[0.050]	[0.046]	[0.045]
WCommHN (Upper bound)	0.017	-0.014	0.060	0.066
	[0.034]	[0.052]	[0.046]	[0.045]
WCommHN missing rate	0.389	0.311	0.018	0.018
WHN missing rate	0.380	0.302	0.017	0.017

Note: * p<0.1, ** p<0.05, *** p<0.01. Standard errors clustered at the village level in brackets. The outcomes and specifications used to produce these estimates are the same as those presented in Table 3. The Lee bounds reported in the top panel correspond to the estimate of WCommHN treatment effects with respect to the Control group. The Lee bounds reported in the bottom panel correspond to the estimate of WCommHN treatment effects with respect to the WHN group.

Table A3d: Program impacts on women's and children's nutrition: Lee bounds.

	(1)	(2)	(3)
	Panel A: Food Intake (Women and Children)		
	Carbohydrates ASTE	Animal-sourced foods ASTE	Fruit & veg ASTE
	WCommHN vs. Control		
WCommHN (Lower bound)	0.138***	0.104**	0.162***
	[0.046]	[0.047]	[0.047]
WCommHN (Upper bound)	0.153***	0.133***	0.175***
	[0.046]	[0.050]	[0.046]
WCommHN missing rate	0.039	0.039	0.039
Control missing rate	0.043	0.043	0.043
	WCommHN vs. WHN		
WCommHN (Lower bound)	0.018	0.149***	-0.005
	[0.044]	[0.048]	[0.043]
WCommHN (Upper bound)	0.031	0.176***	0.008
	[0.043]	[0.047]	[0.043]
WCommHN missing rate	0.039	0.039	0.039
WHN missing rate	0.036	0.036	0.036
	Panel B: Food Expenditure and Crop Allocation		
	Rice exp pc	Meat/fish exp pc	Grows more fruit/veg
	WCommHN vs. Control		
WCommHN (Lower bound)	28.412*	146.041**	0.072***
	[16.988]	[64.909]	[0.017]
WCommHN (Upper bound)	62.674***	272.485***	0.076***
	[18.871]	[71.738]	[0.017]
WCommHN missing rate	0.083	0.086	0.047
Control missing rate	0.099	0.105	0.043
	WCommHN vs. WHN		
WCommHN (Lower bound)	19.295	197.852***	-0.043**
	[19.414]	[71.060]	[0.018]
WCommHN (Upper bound)	40.662**	222.177***	-0.034*
	[18.243]	[70.865]	[0.018]
WCommHN missing rate	0.083	0.086	0.047
WHN missing rate	0.075	0.082	0.056

Note: * p<0.1, ** p<0.05, *** p<0.01. Standard errors clustered at the village level in brackets. The outcomes and specifications used to produce these estimates are the same as those presented in Table 4. In both Panels A and B, the Lee bounds reported in the top two rows correspond to the estimate of WCommHN treatment effects with respect to the Control group while those reported in the bottom two rows correspond to the estimate of WCommHN treatment effects with respect to the WHN group.

Table A3e: Program impacts on child health outcomes: Lee bounds.

	(1)	(2)	(3)
	Weight-for-age Z-score	Height-for-age Z-score	Birth weight (KGs)
	WCommHN vs. Control		
WCommHN (Lower bound)	-0.023	-0.018	0.191***
	[0.046]	[0.053]	[0.067]
WCommHN (Upper bound)	0.080*	0.077	0.241***
	[0.045]	[0.053]	[0.070]
WCommHN missing rate	0.624	0.626	0.919
Control missing rate	0.617	0.620	0.918
	WCommHN vs. WHN		
WCommHN (Lower bound)	-0.001	-0.021	0.138**
	[0.047]	[0.054]	[0.062]
WCommHN (Upper bound)	0.072	0.097*	0.230***
	[0.047]	[0.055]	[0.063]
WCommHN missing rate	0.624	0.626	0.919
WHN missing rate	0.628	0.632	0.924

Note: * p<0.1, ** p<0.05, *** p<0.01. Standard errors clustered at the village level in brackets. The outcomes and specifications used to produce these estimates are the same as those presented in Table 5. The Lee bounds reported in the top panel correspond to the estimate of WCommHN treatment effects with respect to the Control group. The Lee bounds reported in the bottom panel correspond to the estimate of WCommHN treatment effects with respect to the WHN group. The missing rates are noticeably higher than in Tables A3a-A3d because, in columns (1) and (2), the sample of child-level observations is restricted to children aged 23 months or less at the start of the training programs in February 2013, and in column (3), the sample is restricted to babies born after the start of the intervention. We trim the top 5% of values of this outcome (all of which are $>$ 5KG).

Table A4a: Men's perceptions of changes to spousal relationships and communication (cf. Table 1, col. (1)-(3), and Table 2, col. (1)-(5)).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Relationship improved	Wife part of household decisions	Couple makes decisions together	Discusses family planning with spouse	Discusses HIV with spouse	Health & Nutrition discussion ASTE	Discusses HH finance with spouse	Overall discussion ASTE
WCommHN	0.068*	-0.045	0.022	0.003	0.035	0.061	0.004	0.070*
	[0.041]	[0.043]	[0.043]	[0.011]	[0.022]	[0.045]	[0.018]	[0.041]
WHN	0.028	-0.081*	-0.074*	0.001	0.006	0.042	-0.008	0.032
	[0.041]	[0.043]	[0.041]	[0.011]	[0.020]	[0.043]	[0.017]	[0.039]
MHN	0.118***	-0.095**	-0.010	0.024**	0.025	0.093**	0.014	0.116***
	[0.042]	[0.043]	[0.042]	[0.011]	[0.021]	[0.043]	[0.017]	[0.040]
Control mean of outcome	0.000	0.000	0.000	0.918	0.702	-0.000	0.747	-0.000
	(1.000)	(1.000)	(1.000)	(0.275)	(0.458)	(1.000)	(0.435)	(1.000)
p-value: WCommHN=WHN	0.324	0.385	0.022	0.806	0.161	0.656	0.510	0.318
p-value: WCommHN=MHN	0.226	0.221	0.463	0.037	0.638	0.456	0.570	0.241
p-value: WHN=MHN	0.029	0.725	0.115	0.021	0.339	0.203	0.194	0.022
Observations	5,159	5,050	5,050	4,925	5,176	5,176	5,053	5,059

Note: * p<0.1, ** p<0.05, *** p<0.01. Standard errors clustered at the village level in brackets. The p-values show the results of the test of the null hypothesis of equal treatment effects between the different intervention arms. We report the Control group standard deviation of the outcome variable underneath the Control mean in parentheses. All specifications control for stratum and district fixed effects. Whenever the outcome variable was collected at baseline, we also control for the baseline value of the outcome (columns (2), (3), (4), (7), (8)). Column (1) shows the ASTE of pooling all outcomes collected at endline on whether the relationship improved along the following dimensions, according to the men's reports: husband listens more to wife; wife listens more to husband; husband and wife share more information; husband and wife have fewer arguments; husband is more involved with the family; husband is more likely to share household finances with wife. Column (2) shows the ASTE of the following binary outcomes: woman has a say in: daily household needs; children's health costs; what and how much to feed the children; how to spend her own earnings. Column (3) shows the joint decision-making ASTE, constructed from the same set of questions as column (2), but where each indicator entering the index is equal to 1 if the couple makes the decision together, and 0 otherwise. Note that fewer variables enter this index than the ASTE in Table 1, as the men's survey captures fewer dimensions of women's decision-making power than the women's survey. Column (6), Health and Nutrition discussion ASTE: Very often discusses health and nutrition with spouse; Husband very often suggests types of food to eat; Husband very often makes suggestions about children's health care. Column (8): ASTE of all outcomes in columns (4), (5) and (7) + the 3 outcomes making up the ASTE in column (6).

Table A4b: Program impacts on shared decision-making when both spouses' reports are concordant.

	(1) Wife has a say ASTE	(2) Decisions made jointly ASTE
WCommHN	0.020	0.110**
	[0.044]	[0.049]
WHN	-0.020	0.006
	[0.044]	[0.043]
MHN	-0.062	0.057
	[0.042]	[0.041]
Control mean of outcome	0.000	-0.000
	(1.000)	(1.000)
p-value: WCommHN=WHN	0.365	0.031
p-value: WCommHN=MHN	0.053	0.249
p-value: WHN=MHN	0.314	0.212
Observations	5,247	5,377

Note: * p<0.1, ** p<0.05, *** p<0.01. Standard errors clustered at the village level in brackets. The p-values show the results of the test of the null hypothesis of equal treatment effects between the different intervention arms. We report the Control group standard deviation of the outcome variable underneath the Control mean in parentheses. All specifications control for stratum and district fixed effects, and the baseline value of the outcome. Column (1) shows the ASTE of binary indicators equal to 1 if *both* husband and wife report that the woman has a say in: daily household needs; children's health costs; what and how much to feed the children; how to spend her own earnings. Column (2) shows the joint decision-making ASTE, constructed from the same set of questions as column (1), but where each indicator entering the index is equal to 1 if both spouses report that the couple makes the decision together, and 0 otherwise.

Table A5a: Components of Relationship Improvements Index (cf. Table 1, column (1)).

	(1)	(2)	(3)	(4)	(5)	(6)
	Husband listens more to wife	Wife listens more to husband	Share more information	Have fewer arguments	Husband more involved w/ family	Share household finances
WCommHN	0.082***	0.081***	0.088***	0.076***	0.049**	0.067***
	[0.018]	[0.018]	[0.020]	[0.019]	[0.019]	[0.020]
WHN	0.029*	0.006	0.014	0.025	0.009	0.016
	[0.017]	[0.016]	[0.017]	[0.017]	[0.019]	[0.018]
MHN	0.014	0.016	0.015	0.028*	-0.000	0.021
	[0.017]	[0.017]	[0.018]	[0.016]	[0.019]	[0.018]
Control mean of outcome	0.226	0.212	0.254	0.217	0.218	0.252
	(0.419)	(0.409)	(0.436)	(0.412)	(0.413)	(0.434)
p-value: WCommHN=WHN	0.004	0.000	0.000	0.008	0.045	0.010
p-value: WCommHN=MHN	0.000	0.000	0.000	0.008	0.013	0.020
p-value: WHN=MHN	0.372	0.565	0.959	0.851	0.625	0.778
Observations	5,177	5,177	5,177	5,177	5,177	5,177

Note: * p<0.1, ** p<0.05, *** p<0.01. Standard errors clustered at the village level in brackets. Columns (1)-(6) display the estimates of the different groups' impacts on indicators of how marital communication and spousal relationships changed since baseline, according to the women's survey. All specifications control for stratum and district fixed effects. The p-values show the results of the test of the null hypothesis of equal treatment effects between the different intervention arms. We report the Control group standard deviation of the outcome variable underneath the Control mean in parentheses.

Table A5b: Components of Woman's Decision-making Power Index (cf. Table 1, column (2)).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Wife has a say in:								
	Daily household needs	Major household purchases	Save or spend money	Spending own earnings	Children's health costs	What to feed the children	Schooling expenses	Women's clothing	Children's clothing
WCommHN	0.034	0.038*	0.046**	0.003	0.039*	0.011	0.013	0.018	0.017
	[0.022]	[0.022]	[0.022]	[0.010]	[0.022]	[0.007]	[0.024]	[0.019]	[0.019]
WHN	-0.002	0.024	0.002	-0.001	0.012	0.008	0.013	0.027	0.000
	[0.022]	[0.022]	[0.022]	[0.009]	[0.019]	[0.008]	[0.024]	[0.018]	[0.017]
MHN	0.008	0.044**	0.008	0.002	0.023	-0.005	0.003	0.046**	0.036**
	[0.020]	[0.022]	[0.021]	[0.009]	[0.019]	[0.008]	[0.023]	[0.018]	[0.018]
Control mean of outcome	0.521	0.478	0.494	0.946	0.391	0.956	0.346	0.708	0.680
	(0.500)	(0.500)	(0.500)	(0.227)	(0.488)	(0.206)	(0.476)	(0.455)	(0.467)
p-value: WCommHN=WHN	0.102	0.488	0.044	0.693	0.177	0.681	0.984	0.632	0.396
p-value: WCommHN=MHN	0.218	0.775	0.080	0.985	0.414	0.023	0.613	0.139	0.311
p-value: WHN=MHN	0.607	0.319	0.760	0.688	0.544	0.076	0.628	0.288	0.042
Observations	5,281	5,276	5,143	5,208	5,163	5,155	3,842	5,281	5,169

Note: * p<0.1, ** p<0.05, *** p<0.01. Standard errors clustered at the village level in brackets. The outcomes are binary indicators equal to 1 if the woman reports that the decision is made either jointly or by the woman. In column (7), the sample is restricted by cases of "not applicable" due to children not attending school (some because they are too young). All specifications control for stratum and district fixed effects, and the baseline value of the outcome. The p-values show the results of the test of the null hypothesis of equal treatment effects between the different intervention arms. We report the Control group standard deviation of the outcome variable underneath the Control mean in parentheses.

Table A5c: Components of Joint Decision-making Index (cf. Table 1, column (3)).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Decisions made jointly by couple:								
	Daily household needs	Major household purchases	Save or spend money	Spending own earnings	Children's health costs	What to feed the children	Schooling expenses	Women's clothing	Children's clothing
WCommHN	0.038*	0.046**	0.056**	0.043**	0.054***	-0.008	0.039*	0.020	0.048**
	[0.020]	[0.019]	[0.023]	[0.021]	[0.021]	[0.014]	[0.022]	[0.019]	[0.020]
WHN	-0.010	0.014	-0.002	-0.001	0.009	-0.013	0.018	0.035**	0.005
	[0.020]	[0.018]	[0.021]	[0.019]	[0.018]	[0.013]	[0.022]	[0.017]	[0.020]
MHN	-0.005	0.046**	0.003	0.006	0.025	0.027*	0.019	0.027	0.043**
	[0.019]	[0.019]	[0.021]	[0.019]	[0.018]	[0.014]	[0.021]	[0.018]	[0.020]
Control mean of outcome	0.334	0.315	0.394	0.252	0.277	0.136	0.258	0.224	0.361
	(0.472)	(0.465)	(0.489)	(0.434)	(0.448)	(0.343)	(0.438)	(0.417)	(0.480)
p-value: WCommHN=WHN	0.020	0.074	0.009	0.024	0.021	0.682	0.340	0.406	0.041
p-value: WCommHN=MHN	0.026	0.972	0.012	0.050	0.131	0.010	0.349	0.679	0.828
p-value: WHN=MHN	0.793	0.079	0.816	0.683	0.321	0.002	0.951	0.670	0.066
Observations	5,281	5,276	5,143	5,208	5,163	5,155	3,842	5,281	5,169

Note: * p<0.1, ** p<0.05, *** p<0.01. Standard errors clustered at the village level in brackets. The outcomes are binary indicators equal to 1 if the woman reports that the decision is made jointly by the couple (husband and wife together). In column (7), the sample is restricted by cases of "not applicable" due to children not attending school (some because they are too young). All specifications control for stratum and district fixed effects, and the baseline value of the outcome. The p-values show the results of the test of the null hypothesis of equal treatment effects between the different intervention arms. We report the Control group standard deviation of the outcome variable underneath the Control mean in parentheses.

Table A5d: Components of Husband's Violent Behavior Index (cf. Table 1, column (4)).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Husband less likely to exert violent behavior:						
	Humiliate	Threaten	Insult	Beat	Push	Slap	Other
WCommHN	-0.004	0.018	0.016	0.025**	0.020*	0.041***	0.001
	[0.011]	[0.014]	[0.016]	[0.011]	[0.011]	[0.012]	[0.011]
WHN	-0.007	0.031**	0.014	0.024**	0.022**	0.031***	0.007
	[0.011]	[0.014]	[0.016]	[0.010]	[0.011]	[0.012]	[0.010]
MHN	-0.004	0.031**	0.029*	0.017	0.028***	0.027**	0.001
	[0.010]	[0.014]	[0.016]	[0.011]	[0.011]	[0.012]	[0.010]
Control mean of outcome	0.910	0.849	0.818	0.899	0.895	0.875	0.920
	(0.286)	(0.359)	(0.386)	(0.302)	(0.307)	(0.331)	(0.272)
p-value: WCommHN=WHN	0.771	0.317	0.921	0.897	0.806	0.340	0.544
p-value: WCommHN=MHN	0.999	0.305	0.383	0.431	0.422	0.230	0.998
p-value: WHN=MHN	0.762	0.982	0.352	0.460	0.554	0.734	0.524
Observations	5,179	5,167	5,170	5,171	5,164	5,169	5,168

Note: * p<0.1, ** p<0.05, *** p<0.01. Standard errors clustered at the village level in brackets. All specifications control for stratum and district fixed effects, and the baseline value of the outcome. The p-values show the results of the test of the null hypothesis of equal treatment effects between the different intervention arms. We report the Control group standard deviation of the outcome variable underneath the Control mean in parentheses.

Table A6a: Components of Health and Nutrition Discussion Index (cf. Table 2, column (3)).

	(1)	(2)	(3)
	Spouses discuss family's health & nutrition improvement	Husband makes suggestions about types of food to eat	Husband makes suggestions about children's health care
WCommHN	0.071***	0.058***	0.063***
	[0.020]	[0.019]	[0.020]
WHN	0.021	0.009	0.070***
	[0.019]	[0.019]	[0.021]
MHN	0.010	0.055***	0.048**
	[0.019]	[0.019]	[0.020]
Control mean of outcome	0.650	0.715	0.518
	(0.477)	(0.452)	(0.500)
p-value: WCommHN=WHN	0.007	0.009	0.732
p-value: WCommHN=MHN	0.001	0.888	0.456
p-value: WHN=MHN	0.540	0.013	0.283
Observations	5,191	5,191	5,191

Note: * p<0.1, ** p<0.05, *** p<0.01. Standard errors clustered at the village level in brackets. All specifications control for stratum and district fixed effects, and the baseline value of the outcome. The p-values show the results of the test of the null hypothesis of equal treatment effects between the different intervention arms. We report the Control group standard deviation of the outcome variable underneath the Control mean in parentheses.

Table A6b: Health Knowledge Index: Components (cf. Table 2, column (6))

	Panel A: Female respondents							
	Colostrum important for immunity/growth	Introduce other liquid than breast milk at 6mo.	Introduce other food at 6mo.	Lack of balanced diet impacts child growth	Babies should be breastfed for 24 months	Children should be dewormed every 6 months	Worms can contribute to anemia and malaria	Give ORS if child is vomitting or has diarrhea
WCommHN	0.093***	0.105***	0.069***	0.065***	0.030*	0.026*	-0.004	0.104***
	[0.025]	[0.020]	[0.016]	[0.011]	[0.018]	[0.014]	[0.022]	[0.022]
WHN	0.064***	0.080***	0.066***	0.055***	0.044**	0.050***	0.011	0.128***
	[0.024]	[0.020]	[0.017]	[0.012]	[0.017]	[0.015]	[0.021]	[0.022]
MHN	-0.009	0.018	-0.003	0.037***	-0.020	0.027*	0.027	0.037*
	[0.026]	[0.020]	[0.018]	[0.013]	[0.017]	[0.015]	[0.020]	[0.020]
Control mean	0.525	0.685	0.783	0.865	0.778	0.142	0.611	0.492
	(0.500)	(0.465)	(0.412)	(0.342)	(0.416)	(0.350)	(0.488)	(0.500)
p: WCommHN=WHN	0.216	0.159	0.824	0.321	0.435	0.094	0.499	0.305
p: WCommHN=WHN	0.000	0.000	0.000	0.010	0.005	0.955	0.153	0.002
p: WCommHN=WHN	0.002	0.000	0.000	0.120	0.000	0.140	0.453	0.000
Observations	5,288	5,278	5,269	5,283	5,148	5,281	5,288	5,288
	Boys and girls should both eat as much meat	Low-risk pregnant women should give birth in hospital	Animal protein is not less important for women	Best foods to eat if you have anemia	Water must be boiled for several minutes to make it clean	Male condoms can only be used once	Poor hygiene can impact child's intelligence	Correctly identify healthy food plate for adult
WCommHN	0.024	0.068***	0.013	0.118***	0.081***	0.012**	0.035**	0.028**
	[0.018]	[0.022]	[0.013]	[0.020]	[0.019]	[0.005]	[0.016]	[0.013]
WHN	-0.008	0.025	0.020*	0.101***	0.070***	0.004	0.038**	0.025**
	[0.017]	[0.022]	[0.012]	[0.019]	[0.020]	[0.006]	[0.015]	[0.011]
MHN	-0.002	0.010	0.023*	0.023	0.041**	-0.003	0.025	0.014
	[0.016]	[0.023]	[0.013]	[0.019]	[0.021]	[0.006]	[0.015]	[0.012]
Control mean	0.742	0.571	0.879	0.607	0.622	0.975	0.829	0.890
	(0.437)	(0.495)	(0.326)	(0.489)	(0.485)	(0.157)	(0.377)	(0.313)
p: WCommHN=WHN	0.083	0.056	0.493	0.365	0.562	0.088	0.840	0.864
p: WCommHN=WHN	0.148	0.014	0.380	0.000	0.040	0.007	0.524	0.261
p: WCommHN=WHN	0.726	0.514	0.796	0.000	0.146	0.262	0.376	0.274
Observations	5,288	5,288	5,284	5,288	5,286	5,120	5,283	5,288

Note: * p<0.1, ** p<0.05, *** p<0.01. Standard errors clustered at the village level in brackets. All specifications control for stratum and district fixed effects, and baseline values of the outcome whenever it is available. The p-values show the results of the test of the null hypothesis of equal treatment effects between the different intervention arms. We report the Control group standard deviation of the outcome variable underneath the Control mean in parentheses.

Table A6b (continued): Health Knowledge Index: Components (cf. Table 2, column (7)).

	Panel B: Male respondents							
	Colostrum important for immunity/growth	Introduce other liquid than breast milk at 6 mo.	Introduce other food at 6 mo.	Lack of balanced diet impacts child growth	Babies should be breastfed for 24 months	Children should be dewormed every 6 months	Worms can contribute to anemia and malaria	Give ORS if child is vomitting or has diarrhea
WCommHN	-0.001	0.017	0.010	-0.009	0.025	-0.001	0.007	0.043**
	[0.020]	[0.021]	[0.019]	[0.017]	[0.019]	[0.014]	[0.019]	[0.020]
WHN	-0.018	0.002	-0.012	0.009	0.025	-0.004	0.049**	0.048**
	[0.021]	[0.019]	[0.020]	[0.017]	[0.019]	[0.014]	[0.020]	[0.020]
MHN	0.030	0.085***	0.072***	0.037**	0.071***	0.010	0.013	0.052**
	[0.022]	[0.020]	[0.020]	[0.017]	[0.019]	[0.015]	[0.020]	[0.020]
Control mean	0.387	0.561	0.569	0.788	0.619	0.155	0.622	0.271
	(0.487)	(0.496)	(0.495)	(0.409)	(0.486)	(0.362)	(0.485)	(0.445)
p: WCommHN=WHN	0.371	0.435	0.272	0.296	0.985	0.823	0.034	0.837
p: WCommHN=WHN	0.129	0.001	0.002	0.008	0.016	0.441	0.788	0.677
p: WCommHN=WHN	0.021	0.000	0.000	0.098	0.017	0.329	0.070	0.832
Observations	5,176	5,045	5,048	5,047	5,039	4,830	5,176	5,176
	Boys and girls should both eat as much meat	Low-risk pregnant women should give birth in hospital	Animal protein is not less important for women	Best foods to eat if you have anemia	Water must be boiled for several minutes to make it clean	Male condoms can only be used once	Poor hygiene can impact child's intelligence	Correctly identify healthy food plate for adult
WCommHN	-0.030	0.018	-0.026	-0.011	0.000	-0.007	0.022	0.015
	[0.019]	[0.022]	[0.016]	[0.022]	[0.023]	[0.005]	[0.017]	[0.012]
WHN	0.003	0.010	-0.009	0.015	0.024	-0.002	0.023	-0.000
	[0.019]	[0.021]	[0.015]	[0.021]	[0.023]	[0.005]	[0.015]	[0.012]
MHN	0.014	0.081***	0.000	0.112***	0.043*	0.002	0.040***	0.023**
	[0.018]	[0.019]	[0.016]	[0.021]	[0.022]	[0.005]	[0.015]	[0.011]
Control mean	0.782	0.604	0.849	0.560	0.583	0.985	0.851	0.894
	(0.413)	(0.489)	(0.358)	(0.497)	(0.493)	(0.121)	(0.356)	(0.308)
p: WCommHN=WHN	0.062	0.719	0.274	0.254	0.315	0.425	0.989	0.167
p: WCommHN=WHN	0.007	0.003	0.090	0.000	0.058	0.093	0.237	0.432
p: WCommHN=WHN	0.517	0.000	0.506	0.000	0.400	0.378	0.184	0.033
Observations	5,092	5,176	4,984	5,176	5,046	5,176	5,042	5,176

Note: * p<0.1, ** p<0.05, *** p<0.01. Standard errors clustered at the village level in brackets. All specifications control for stratum and district fixed effects, and baseline values of the outcome whenever it is available. The p-values show the results of the test of the null hypothesis of equal treatment effects between the different intervention arms. We report the Control group standard deviation of the outcome variable underneath the Control mean in parentheses.

Table A7: Health Behavior Index: Components (cf. Table 3).

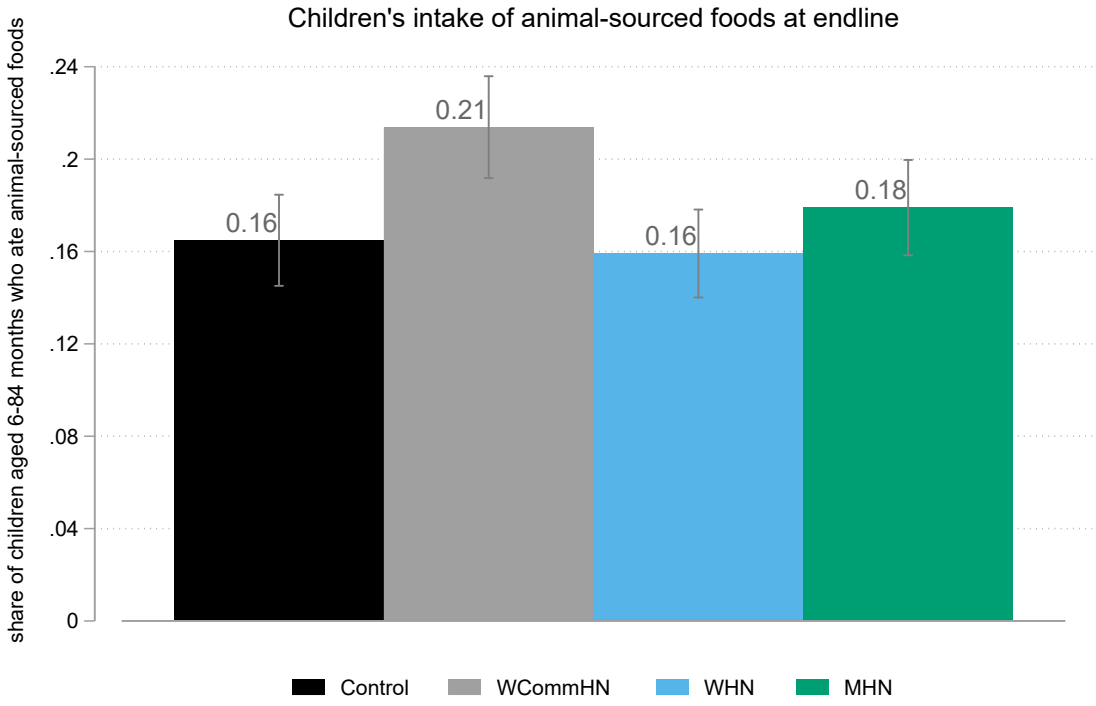
	Newborn health						
	First health check timing < median	Ever breastfed	Time after birth tried breastfeeding < median	Fed colostrum at birth	Woman ate more when breastfeeding	No other liquids in first week	No other liquids in first 3 months
WCommHN	0.013	0.008	0.073**	0.006	0.070***	0.134***	0.115***
	[0.033]	[0.005]	[0.030]	[0.006]	[0.026]	[0.028]	[0.029]
WHN	0.030	0.005	0.053*	0.008	0.111***	0.099***	0.077***
	[0.033]	[0.005]	[0.028]	[0.005]	[0.024]	[0.029]	[0.030]
MHN	0.023	0.003	-0.020	0.003	0.031	0.034	0.032
	[0.034]	[0.006]	[0.029]	[0.006]	[0.027]	[0.029]	[0.029]
Control mean of outcome	0.441	0.988	0.447	0.986	0.397	0.453	0.522
	(0.497)	(0.108)	(0.498)	(0.118)	(0.490)	(0.498)	(0.500)
p-value: WEMP=WHN	0.601	0.535	0.493	0.644	0.098	0.220	0.209
p-value: WEMP=MHN	0.759	0.382	0.002	0.448	0.147	0.001	0.004
p-value: WHN=MHN	0.835	0.711	0.009	0.221	0.002	0.030	0.132
Observations	2,455	2,697	2,660	2,681	2,663	2,681	2,619

	Newborn health				Maternal health		
	No solid foods in first 3 months	Number of vaccinations	Vitamin A in first 6 weeks	Vitamin A in last 6 months	Received antenatal care	Ate more of some foods during this pregnancy	Received iron during last pregnancy or in 2 months after
WCommHN	-0.006	0.112	0.004	0.048*	-0.001	0.078***	0.062***
	[0.008]	[0.136]	[0.025]	[0.025]	[0.014]	[0.023]	[0.020]
WHN	-0.002	-0.019	0.008	0.026	-0.008	0.094***	0.063***
	[0.008]	[0.138]	[0.021]	[0.025]	[0.014]	[0.023]	[0.021]
MHN	-0.006	0.248*	0.043*	0.082***	0.015	0.061**	0.066***
	[0.008]	[0.137]	[0.023]	[0.025]	[0.014]	[0.024]	[0.020]
Control mean of outcome	0.977	7.396	0.760	0.638	0.908	0.587	0.817
	(0.150)	(2.421)	(0.427)	(0.481)	(0.289)	(0.493)	(0.387)
p-value: WEMP=WHN	0.671	0.361	0.882	0.398	0.601	0.447	0.938
p-value: WEMP=MHN	0.997	0.337	0.139	0.197	0.248	0.419	0.798
p-value: WHN=MHN	0.675	0.065	0.125	0.032	0.105	0.138	0.868
Observations	2,578	2,837	2,830	2,835	3,446	3,440	2,842

	Household sanitary practices						
	Wash hands after toilet (Man)	Wash hands before a meal (Man)	Wash hands after toilet (Woman)	Wash hands before a meal (Man)	Treat drinking water	Sweep latrine at least twice a week	Made improvements to latrine
WCommHN	0.024	0.049**	0.081***	0.080***	0.047***	0.102***	0.118***
	[0.021]	[0.022]	[0.022]	[0.022]	[0.010]	[0.021]	[0.023]
WHN	0.027	0.057***	0.066***	0.092***	0.045***	0.071***	0.090***
	[0.023]	[0.021]	[0.022]	[0.021]	[0.010]	[0.021]	[0.023]
MHN	0.032	0.066***	0.014	0.020	0.007	0.028	0.022
	[0.022]	[0.022]	[0.020]	[0.020]	[0.011]	[0.020]	[0.021]
Control mean of outcome	0.332	0.562	0.373	0.575	0.924	0.441	0.326
	(0.471)	(0.496)	(0.484)	(0.495)	(0.265)	(0.497)	(0.469)
p-value: WEMP=WHN	0.884	0.740	0.511	0.571	0.723	0.116	0.239
p-value: WEMP=MHN	0.742	0.465	0.002	0.007	0.000	0.000	0.000
p-value: WHN=MHN	0.863	0.664	0.018	0.001	0.000	0.025	0.003
Observations	4,872	5,039	5,133	5,279	5,286	5,175	5,283

Note: * p<0.1, ** p<0.05, *** p<0.01. Standard errors clustered at the village level in brackets. All specifications control for stratum and district fixed effects, and the baseline value of the outcome. Newborn Health: components of the index in Table 3, column (1). Maternal Health: components of the index in Table 3, column (2). Household Sanitary Practices: components of the index in Table 3, column (3). The p-values show the results of the test of the null hypothesis of equal treatment effects between the different intervention arms. We report the Control group standard deviation of the outcome variable underneath the Control mean in parentheses.

Figure A1: Program impacts on children's intake of animal-sourced foods.



Note: Raw means of the share of households in each group in which children aged 6-84 months ate at least one type of animal-sourced foods (meat, eggs, fish or organ meats) in the past 24 hours, at endline.

Table A8: Program impacts on additional anthropometric outcomes and birth weight by measurement type.

	(1)	(2)	(3)	(4)	(5)
	MUAC-for-age Z-score	Hb level (g/dl)	Birth weight, new babies (KG) (birth card)	Birth weight, new babies (KG) (self-reported)	Weight was read off birth card (yes/no)
WCommHN	0.032	-0.064	0.191**	0.274***	0.086
	[0.047]	[0.064]	[0.086]	[0.105]	[0.054]
WHN	0.057	-0.054	-0.048	0.121	0.122**
	[0.047]	[0.063]	[0.078]	[0.117]	[0.053]
MHN	0.066	-0.012	-0.056	0.069	0.086*
	[0.046]	[0.064]	[0.075]	[0.110]	[0.048]
Control mean of outcome	-0.321	11.408	3.302	3.288	0.449
	(1.014)	(1.306)	(0.531)	(0.678)	(0.499)
p-value: WCommHN=WHN	0.586	0.882	0.001	0.216	0.502
p-value: WCommHN=MHN	0.448	0.457	0.001	0.080	0.997
p-value: WHN=MHN	0.846	0.546	0.899	0.678	0.469
Observations	5,677	5,982	377	341	718

Note: * p<0.1, ** p<0.05, *** p<0.01. Standard errors clustered at the village level in brackets. All specifications control for stratum, district and monthXyear-of-birth fixed effects, as well as the child's gender. In columns (1) and (2), we also control for age-in-months-at-endline dummies. MUAC: Middle-Upper-Arm-Circumference; Hb: Hemoglobin. In columns (1) and (2), the sample is all children aged 23 months or less at the start of the program, who were 42 months or less at endline. In column (1), however, the sample excludes babies who were less than 3 months old at endline because, following the WHO guidelines for measurement of MUAC-for-age Z-scores, these are only defined for children aged 3 months and above. Columns (3) and (4) report effects on the birth weight of babies born after the start of the program (as in Table 5, column (3)) separately by whether the birth weight was read off the baby's birth card (column (3)) or self-reported (column (4)). We trim the top 5% of values of this outcome (all of which are > 5KG). Column (5) shows impacts of each treatment group on the probability that the weight was read off the baby's birth card. The p-values show the results of the test of the null hypothesis of equal treatment effects between the different intervention arms. We report the Control group standard deviation of the outcome variable underneath the Control mean in parentheses.

Appendix B: the WHN and WCommHN programs

B1 Health Curriculum

The Health Curriculum was identical in MHN, WHN and WCommHN villages:

- SESSION 1 – INTRODUCTION, OVERVIEW & BASIC KNOWLEDGE
- SESSION 2 – MATERNAL HEALTH AND CHILD NUTRITION
- SESSION 3 – PRENATAL NUTRITION
- SESSION 4 – BREASTFEEDING
- SESSION 5 – COMPLEMENTARY FEEDING
- SESSION 6 – FOOD GROUPS
- SESSION 7 – MICRONUTRIENTS FOR MOTHERS & CHILDREN
- SESSION 8 – SAFE WATER & SANITATION PRACTICES
- SESSION 9 – FOOD PREPARATION & RECIPES
- SESSION 10 – REVIEW
- SESSION 11 – HIV/AIDS
- SESSION 12 – CONTRACEPTION & FAMILY PLANNING
- SESSION 13 – PRECONCEPTION
- SESSION 14 – PRE & POSTNATAL PRACTICES IN YOUR COMMUNITY
- SESSION 15 – BIRTHING
- SESSION 16 – INFANT ILLNESS & PREVENTATIVE HEALTH PRACTICES
- SESSION 17 – POST-NATAL CARE & BIRTH SPACING
- SESSION 18 – INFANT GROWTH MONITORING & PROMOTION
- SESSION 19 - REVIEW
- SESSION 20 - GRADUATION

Extracts from the Health curriculum

SESSION 6 – FOOD GROUPS

KEY MESSAGES:

1. Foods can be placed into categories according to their nutritional value
2. It is important to get a good mix of these food groups to stay healthy and grow
3. Use the healthy food plate to see how much of each food group you should eat

Food Groups

1. Carbohydrates
   - Bread, rice, cereal (not sugary cereals), wheat, millet, maize, flour, cassava, matooke, sweet potato, yams
   -

2. Fruit and Vegetables
   - All fruits and vegetables are good for you and the most important thing is to get a good variety. One way to tell is to make sure that you eat a lot of different colored fruits and vegetables
   - Vitamin A rich foods are important for babies and young children. These include: mango, papaya, passion fruit, oranges, dark green leafy vegetables, carrots, yellow sweet potato

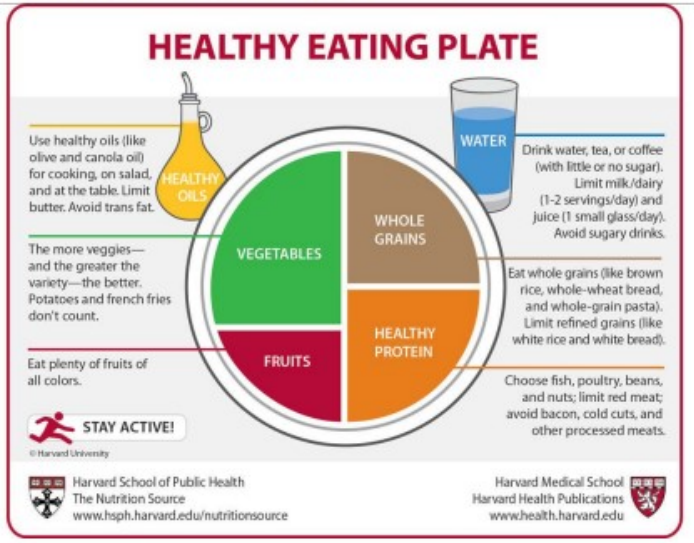
and pumpkin

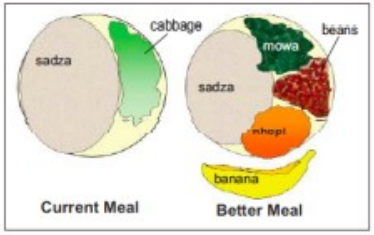
3. Proteins
   - All kinds of meat
   - Milk and foods made from milk such as cheese and yoghurt
   - Eggs
   - Beans, peas and nuts

4. Sugars and Fats
   - Sweets and candies, soda and sugary drinks, oils, margarine and butter (blue band), iodized salt, sugar, ghee

Healthy eating plate

Follow the healthy eating plate to see how much of each food group you should eat. Foods including fruits, vegetables and carbohydrates are very healthy and should be eaten at every meal. Protein from meat and eggs should be eaten often, at least two times per week. Moderate portions of dairy products such as milk and yoghurt should be eaten at least once a week. Sweet food like sugary biscuits and sodas should only be eaten occasionally, as they are not very healthy for the body and do not contain useful nutrients. **Water should be drunk very frequently and is the best thing to drink for adults and children who are no longer breastfeeding.**





B2 Communication Curriculum

In addition to the health curriculum described above, women in WCommHN villages also attended the Communication training. The list of modules covered by that curriculum was as follows:

- SESSION 1 – OVERVIEW AND INTRODUCTION
- SESSION 2 – GENERAL COMMUNICATION STRATEGIES
- SESSION 3 – DECISION-MAKING PROCESS
- SESSION 4 – COMMUNICATING INFANT NEEDS
- SESSION 5 – GENERAL NEGOTIATION STRATEGIES
- SESSION 6 – POWER AND PREVENTING CONFLICT
- SESSION 7 – HEALTHY RELATIONSHIPS / HEALTHY FAMILIES
- SESSION 8 – GENDER RELATIONS
- SESSION 9 – FINANCIAL NEGOTIATION
- SESSION 10 – SELF ESTEEM & GOAL SETTING
- SESSION 11 – HIV / AIDS PREVENTION
- SESSION 12 – NEGOTIATING FAMILY PLANNING USE
- SESSION 13 – COMMUNICATING & NEGOTIATING ANTENATAL NEEDS
- SESSION 14 – RESOURCES IN MY COMMUNITY
- SESSION 15 – HOUSEHOLD BUDGETING
- SESSION 16 – HEALTHY CHILDREN
- SESSION 17 – FATHERHOOD
- SESSION 18 – DOMESTIC VIOLENCE
- SESSION 19 – REVIEW
- SESSION 20 – WRAP UP & RECOGNITION CEREMONY

Extracts from the Communication curriculum

Session 2: General Communication Strategies

Communication: To share or exchange information or news. Communication requires a sender, a message, and a recipient.

Modes of Communication:

- *Passive Response*: Behaving passively means not expressing your own needs and feelings, or expressing them so weakly that they will not be heard
  - *Example*: My husband went to the market today to buy food for the family. I asked him to buy carrots and pumpkin for my small children but when he returned home, he had only purchased matooke and some alcohol for himself. Instead of asking him why he didn't purchase the items, I simply take what was purchased and thank him

- *Assertive Response*: Behaving assertively means asking for what you want or saying how you feel in an honest and respectful way, so that it does not infringe on another person's rights or put the individual down
  - *Example*: My husband went to the market today to buy food for the family. I asked him to buy carrots and pumpkin for my small children but when he returned home, he had only purchased matooke and some alcohol for himself. I ask my husband why he didn't purchase the items and he said that they were too expensive and that he likes to eat motooke anyways. I calmly explain to him that carrots and pumpkins are very important for the children because they keep them healthy. Even though they are a bit more expensive, it is very important for our family to be healthy. I ask my husband to please return to the market and buy the items.

- *Aggressive Response*: Behaving aggressively is asking for what you want or saying how you feel in a threatening, sarcastic, or humiliating way that may offend the other person
  - *Example*: My husband went to the market today to buy food for the family. I asked him to buy carrots and pumpkin for my small children but when he returned home, he had only purchased matooke and some alcohol for himself. I immediately accuse my husband of caring more about himself and getting drunk than about our family. We begin arguing and yelling back and forth.

SESSION 9 – FINANCIAL NEGOTIATION

Time/Length: ~45 minutes

Tools/Materials/Readings:
Flip chart or large paper
Markers

Main Education Points:

- Importance of Spending Money on Nutrition and Healthcare
- Negotiating with my Spouse about Spending Money
- Benefits of Saving Money
- Creating a Plan for Health Expenditures

Activities/Assessments:

- Ice-Breaker: "20 Questions" – See Facilitator Notes for Instruction (**5 minutes**)

  Facilitator should then transition by introducing the topic of financial negotiation. Explain that today we will be talking about how spouses can collaborate when deciding what to spend money on. Begin by asking participants the following questions:
  - Think about the last major purchase that your household made. What was it? Did you communicate with your spouse about making this purchase?
  - Do you think it is important for a husband and wife to talk about household purchases? Why?

- Identifying Healthcare Expenses: (**20 minutes**)
  Women should work together in groups of 2 or 3 for this activity.

  Instruct participants that they should come up with a list of the 5 most important things (can be an item or a service) that they can purchase for their children in order to keep them healthy. List the items in order of importance (1 is most important) and estimate the total cost of each item.
  Example: 1.) Vaccinations (10,000 UGX) 2.) De-worming (2,000 UGX) 3.) Hospital Visit (5,000 UGX for transport) 4.) Healthy Food (1,000UGX per week) 5.) Shoes (10,000 UGX)

  After creating the list of items, participants should identify a plan and timeline for how they would be able to purchase all of these items. Specifically, participants should:
  - Identify who will pay for the items. Will one person buy everything? Will both contribute to purchasing these items?
  - When is it possible to purchase the items? Can some be purchased immediately? Will you need to save up for any of the items?
  - How can you ensure that they items are purchased? Can you agree to purchase the next big item at a certain time, like after the next harvest?

  After 10-15 minutes of preparation, have each pair present to the group.

- Group Discussion: (**10 minutes**)
  The facilitator should lead a group discussion around the benefits of saving money. Explain that saving a small amount of money each week is a way to begin collaborating with your spouse financially. Ensure that you have a purpose for saving and that you and your spouse agree on what the money will be used for.