Can transfers and complementary nutrition programming reduce intimate partner violence four years post-program? Experimental evidence from Bangladesh[*]

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Abstract

Little is known about whether reductions in intimate partner violence (IPV) from transfer programs persist. Using a randomized controlled trial, we find that women in rural Bangladesh who received cash transfers with complementary nutrition programming (including group-based training, home visits, and community meetings) experienced sustained reductions in IPV four years after the program ended. Neither cash transfers alone, nor food transfers with or without complementary nutrition programming, showed sustained impacts on IPV. Evidence suggests that cash with complementary nutrition programming sustained IPV reductions through persistent increases in women's bargaining power, costs to men of perpetrating violence, and men's emotional well-being.

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I. Introduction

Widespread fears exist among program implementers that transfers, in particular cash, targeted to women could put women at risk of violence from their partners – either due to men trying to take control of transfers or due to male backlash in response to shifting power dynamics (Cash Learning Partnership 2015; Mercy Corps 2015; World Bank 2019). A growing body of evidence, however, shows largely the opposite. Buller et al. (2018) review the literature on cash transfer programs and intimate partner violence (IPV) in low- and middle-income countries and find that, across 14 rigorous quantitative studies, over 70% show that a cash transfer program *reduced* IPV on average, despite IPV prevention not being an explicit objective of any of these.[1] Given the multiple adverse consequences of IPV for women (Ellsberg et al. 2008; Kapiga et al. 2017) and their children (see Roy et al. (2019) for references) – along with the growing use of cash transfers in low- and middle-income countries where IPV is highly prevalent (Devries et al. 2013) – cash transfer programs are thus increasingly viewed as a promising platform for leveraging IPV prevention at scale.

However, core to the question of whether transfer programs can be a sustainable solution to reducing IPV is whether impacts persist after programs end – and whether sustainability depends on the transfer modality or complementary programming. Evidence on the sustainability of transfers' impacts on IPV is scarce, as very few studies on transfers and IPV collect post-program data. To date, only one study to our knowledge has done so – Roy et al. (2019), in the context of a program in Bangladesh called the Transfer Modality Research Initiative (TMRI).

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[1] Additional studies published since the review by Buller et al. (2018) include Haushofer et al. (2019); Heath, Hidrobo, and Roy (2020); Peterman, Valli, and Palermo (2022). These also find decreases in IPV due to cash transfers.

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Roy et al. find that a combination of food or cash transfers and group-based nutrition behavior change communication (BCC) led to a sustained reduction in physical IPV 6-10 months post-program among poor rural women.[2,3] Longer-term sustainability of food or cash transfers' impacts on IPV has not been demonstrated in the literature.

Impacts on IPV are likely to persist if impacts persist on the pathways through which transfer programs affect IPV. Buller et al. (2018) identify three such pathways – (i) improved household economic well-being, (ii) reduced intrahousehold conflict, and (iii) improved women's empowerment – and argue that design components are important for how the pathways play out. One increasingly popular design feature of transfer programs is combining transfers with complementary programming to help households graduate out of poverty or address a broader range of outcomes beyond poverty. The complementary programming is often delivered through a group-based platform – such as for trainings on income-generating activities, gender-equitable norms, or nutrition. Group-based approaches on their own have been identified as a promising strategy for empowerment as they build social capital which may facilitate access to

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[2] Behavior change communication refers to messaging and other activities (such as trainings) intended to promote behavior change.

[3] Haushofer et al. (2019) assess impacts of cash transfers in Kenya on IPV for a sample in which half of households were randomized to receive the cash as a lump sum up to 15 months before the endline and half were randomized to receive it in monthly installments including just before the endline (Haushofer and Shapiro 2016). On average across the entire sample, the last transfer was 4.4 months before endline. The authors find significant reductions in physical and sexual IPV at endline. Endline impacts on those receiving monthly installments are not presented separately from endline impacts on those receiving lump sum transfers. However, the average results suggest there may have been "post-program" effects.

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other forms of capital (Arrieta et al. 2019; Brody et al. 2015) and have also been identified as a promising approach for reducing violence against women and girls (Ellsberg et al. 2015).

However, few studies assess which program design components within transfer programs are important for sustainability of impacts on IPV or underlying factors. Exceptions include Bossuroy et al. (2021) who find that, compared to cash transfers alone, cash transfers combined with an additional lump-sum cash grant and cash transfers combined with a psychosocial package led to stronger sustained impacts at 18 months post-program on consumption, food security, psychosocial wellbeing, and women's empowerment, but not intrahousehold dynamics. Haushofer and Shapiro (2018) show that sustained impacts of cash transfers on assets 3 years after the program ended did not differ based on design features that included targeting men versus women, lump-sum versus monthly payments, and large versus small transfers. Baird, McIntosh, and Özler (2019) show that, two years after the end of a cash transfer program targeted to adolescent girls, sustained impacts depended not only on whether transfers were conditioned on schooling, but also on the specific outcome of interest and on whether the adolescent was initially enrolled in school. Lastly, in a companion study to this paper, Ahmed et al. (2020) show that combining transfers, either cash or food, with nutrition BCC led to more sustainable reductions in poverty than transfers alone. While these studies show that sustainability of impacts from transfer programs depends not only on the outcome of interest but also on the programs' design features, we do not know what design components are important specifically for sustainable reductions in IPV.

Understanding whether transfer programs have sustainable impacts on IPV over the longer term and through what pathways – as well as whether program design affects these – is crucial for informing future transfer programming for IPV prevention. In this paper, we

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contribute to addressing these evidence gaps. We assess the sustainability of impacts on IPV of TMRI in Bangladesh – the program studied by Roy et al. (2019) – but do so 4 years after the program ended. TMRI's design included households in the Northern region randomized to receive cash or cash combined with nutrition BCC, as well as households in the Southern region randomized to receive food or food combined with nutrition BCC, allowing us to assess whether complementary activities affect sustainability. We find that the reductions in physical IPV from a combination of cash transfers and BCC that were seen 6-10 months post-program by (Roy et al. 2019) are sustained 4 years after the program ended. However, there are no significant impacts from food transfers with BCC at 4 years post-program. There are also no sustained impacts on IPV from cash transfers alone or food transfers alone. To our knowledge, this is the first evidence of longer-term sustainability of IPV impacts, as well as the first evidence indicating that IPV impacts differ by transfer modality.

We also extend the work by Roy et al. (2019) by conducting careful analysis of the sustainability of pathways underlying IPV impacts 4 years post-program. We focus on three possible pathways, adapted from Buller et al. (2018) based on TMRI's features: (i) improved women's bargaining power; (ii) increased men's cost of perpetrating violence; and (iii) improved poverty-related emotional well-being. Our analysis indicates that, consistent with the pattern of IPV impacts, 4 years after TMRI ended, the combination of cash transfers and BCC leads to sustained impacts on all three of these pathways.

These findings have important implications for program design. They show that a cash transfer program need not have IPV prevention as an explicit objective to result in sustained IPV reduction several years after the end of the program. However, it must lead to sustained impacts on pathways for IPV reduction. In the context of TMRI in Bangladesh, cash transfers combined

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with nutrition BCC led to larger, broader impacts on these pathways 4 years post-program than cash transfers alone, signaling the critical role of the BCC. Adding BCC to cash in the North also appeared more effective in sustainably affecting IPV pathways than adding BCC to food in the South, although we cannot disentangle the role of region from modality.

Although TMRI's results do not imply that nutrition BCC per se is required in every cash transfer program in order for IPV reductions to be sustained, the findings highlight the importance of including *some* programming relevant to the context that sustainably affects IPV pathways. In the case of TMRI in rural Bangladesh – where women's social isolation due to poverty and seclusion norms contributed to low status, and where their low status likely contributed to IPV (Roy et al. 2019) – adding group-based BCC to cash transfers sustainably affected IPV pathways. While we cannot empirically distinguish what features of the BCC drove these results, we believe that both the content of the BCC and its group-based structure played a role in improving women's bargaining power and increasing men's cost of perpetrating violence.

The paper is structured as follows. Section II presents the experimental design of the Transfer Modality Research Initiative and a conceptual framework to guide our analysis of the sustainability of its impacts on IPV. Section III outlines the data we use – including the measurement of IPV and an explanation of the pathways we consider; an assessment of the integrity of the experimental design; and a description of our estimation approach. Section IV describes our main results on the sustainability of TMRI's impacts on IPV and potential pathways for these impacts. Section V provides a discussion of the results and concludes.

II. Program details and conceptual framework

II.A The Transfer Modality Research Initiative

II.A.1 Experimental design

The Transfer Modality Research Initiative (TMRI) was a 2-year pilot safety net program, implemented by the World Food Programme in rural Bangladesh from May 2012 to April 2014. It was based on two cluster-randomized controlled trials (RCTs): one in the northwest region (the "North") and one in the coastal southern region (the "South"). While the North was poorer on average, the South was more disaster-prone and had poorer agroecological conditions for agriculture and livestock-rearing due to salinity of the soil.

In the North, study villages were randomly assigned to a control group or to one of four treatment arms in which beneficiaries received cash transfers ("Cash"), food rations ("Food"), half cash transfers and half food rations ("Cash+Food"), or cash transfers along with nutrition BCC ("Cash+BCC"). In the South, study villages were also randomly assigned to a control group or to one of four treatment arms; the first three treatment groups were the same as in the north. In the fourth treatment group in the South, instead of cash transfers along with nutrition BCC, beneficiaries received food rations along with nutrition BCC ("Food+BCC"). All beneficiaries were poor households with a child aged 0-24 months in March 2012. The mother of the child aged 0-24 months was the designated beneficiary – both the cardholder for receiving transfers and the target participant in BCC activities (see Ahmed et al. (2016) for more detail).

In each region, 250 villages were selected for inclusion in the study and were randomly assigned to one of the four treatment groups or control group for its region. From each village, 10 households were selected for inclusion in TMRI (see Online Appendix A). Thus, TMRI

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included a total of 5,000 targeted households across the North and South – 4,000 treatment

households and 1,000 control households.

II.A.2 Transfers

Beneficiaries in the "Cash" arms received a monthly payment of 1,500 Taka (approximately 19

USD) per household. Payments were delivered using a mobile phone cash transfer system, in

which women collected cash from designated distribution sites using mobile verification of

identity.[4] Beneficiaries in the "Food" arms received a monthly food ration of 30 kilograms (kg)

of rice, 2 kg of *mosoor* pulse (a lentil), and 2 liters of micronutrient-fortified cooking oil. Rations

were handed to beneficiaries at designated food distribution points. The initial value of the food

rations was equal to the value of the cash transfers. Beneficiaries in the "Cash+Food" treatment

arms received half of each of the two types of transfers: 750 Taka, 15 kg of rice, 1 kg of *mosoor*

pulse, and 1 liter of micronutrient-fortified cooking oil. Further details are in Roy et al. (2019).

II.A.3 Behavior change communication

The beneficiaries of the "Cash+BCC" arm in the North and the "Food+BCC" arm in the South

received the same transfers as in the "Cash" only and "Food" only treatment groups,

respectively, as well as a suite of intensive nutrition BCC interventions focused on education and

behavior change at the household and community level (Ahmed et al. 2016). The BCC

intervention involved three complementary activities: (1) weekly group BCC trainings – some

with beneficiaries only and some that invited other family members as well, (2) twice-a-month

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[4] Since this method used a mobile phone handset and SIM card, to preserve the design of the experiment, these were
provided to all women in the study (in all treatment and control arms).

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visits to the beneficiaries' homes, and (3) monthly group meetings between program staff and influential community leaders.

The group BCC trainings solely for beneficiaries occurred on the day of the transfer distribution, once a month. For the remaining group BCC trainings, other household members – particularly mothers-in-law, husbands, and other pregnant or lactating women – were invited to attend along with beneficiaries. These inclusive sessions were intended to increase uptake of BCC messages, as husbands and mothers-in-law are also key decision makers on food purchases, infant and young child feeding practices, and child-rearing in the household. They also served to facilitate women's ability to participate in the BCC, as household members could see the beneficial nature of the trainings and relax restrictions on attendance (given sociocultural norms of female seclusion).

About 9-15 beneficiaries were part of each group. The group trainings took place within 2 km of beneficiaries' homes and lasted approximately one hour, on average. Beneficiaries assigned to a BCC intervention attended on average 48 (in the North) to 49 (in the South) sessions per year.[5] Trainings covered basic nutrition, control and prevention of micronutrient deficiencies, infant and young child feeding, health care, maternal nutrition, and hygiene. The training was led by female Community Nutrition Workers (CNWs) engaged by a local NGO specifically for TMRI. CNWs were trained to impart the BCC content using a variety of interactive methods including question and answer, flashcards, real-life examples, discussions,

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[5] In both the North and the South, more than 50% of beneficiaries assigned to BCC reported that another household member sometimes attended the training sessions.

practical demonstrations, role-playing, and songs.[6] The sessions were lively and gave women opportunities to interact with one another, in a context where female seclusion and poverty-related social exclusion had previously restricted their interactions. Anecdotally, women came early to sessions and left late in order to talk with group members.

CNWs also conducted the twice-per-month home visits to observe household-level practice and encourage the adoption of positive behaviors, as well as followed up with additional home visits as needed for individual counseling to beneficiaries. Although attendance at the group BCC sessions was a "soft" condition of receipt of the transfers, no beneficiaries were dropped from the study for failing to attend sessions; when a mother missed a session, a CNW would follow up with a home visit to uncover why she missed the session and to convey the missed information.

The monthly group meetings with influential community members (such as village heads, religious leaders, school teachers, community elected persons, and local health and family planning staff) were conducted by CNWs and staff from the local NGO, without the beneficiaries present, to explain the purpose and importance of the BCC and to provide them with the information being conveyed to study participants. These meetings aimed at increasing uptake of messages through a supportive community environment as well as facilitating women's participation in BCC.

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[6] The BCC component was designed specifically for TMRI by the World Food Programme in consultations with the International Food Policy Research Institute and local technical experts. Session materials were derived in part from material developed for Alive & Thrive in Bangladesh, a global nutrition initiative that seeks to save lives, prevent illness, and ensure healthy growth of mothers and children.

As the BCC was focused on nutrition, there was no explicit focus on violence or gender issues in any of the BCC components. Interactive exercises included negotiating the purchase and consumption of non-traditional foods for pre-school children, but the emphasis was on how to acquire nutritious foods for the child rather than how to resolve conflict more generally.

II.B. Conceptual framework

For TMRI to have sustained impacts on IPV, we postulate that it should have sustained effects on factors underlying IPV.[7] To guide our analysis, we adapt the conceptual framework of Buller et al. (2018) to address how TMRI's specific intervention components could sustainably reduce IPV. We focus on both the transfers and the BCC and identify the following three pathways: (i) women's bargaining power; (ii) men's cost; and (iii) poverty-related emotional well-being.

The first pathway – "women's bargaining power" – focuses on aspects of empowerment that have a well-defined theoretical relationship with IPV. In non-cooperative household bargaining models, individuals' bargaining power depends on their threat point, which is their out-of-marriage options or a non-cooperative equilibrium (Farmer and Tiefenthaler 1997; Tauchen, Witte, and Long 1991). If cash transfers are targeted to women and remain in their control, their income and thus their threat points increase, improving their bargaining power within the relationship to reduce IPV. Framing as bargaining power instead of empowerment, as done in Buller et al. (2018), captures the notion that not all aspects of empowerment potentially

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[7] Another possibility is habit formation. In particular, reductions in IPV immediately post-program could lead to reductions in IPV over the longer term even without sustained impacts on factors underlying IPV if, for example, utility from perpetrating IPV in a given period is lower when IPV is not perpetrated in prior periods. We do not test directly for this but discuss in our conclusion its possible role in driving the results.

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affected by cash transfers will be sufficient to change intrahousehold dynamics in a way that reduces IPV. For example, a consumer durable jointly owned by the household may empower the woman but may not affect her bargaining power if she loses ownership by leaving the relationship.

We also focus on the role of the BCC in improving women's bargaining power. The transfer of information from the BCC could both increase women's agency as women feel better informed in making decisions and increase respect for the woman within the community. The group-based structure may also lead to increased social interactions. Social ties that resulted from the BCC could increase agency, as well as provide outlets and support for victims to escape violent relationships (Panda and Agarwal 2005; Stets 1991) or settle on a noncooperative equilibrium, making a women's threat point more credible.

The second pathway captures men's costs of inflicting IPV. Women's social capital that resulted from the BCC factors into this pathway as well, as it increases the social cost of men's violent behavior by increasing the chances that violence is recognized by others and increases "social control" in the form of others' disapproval (Stets 1991; Van Wyk et al. 2003).[8] We also conceptualize the private costs of men inflicting violence within this pathway, such as through potential changes in men's norms on the acceptability of violence. TMRI, and in particular the BCC, could change men's perception of the justifiability of IPV if, for example, seeing changes

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[8] In Bangladesh, Lentz (2018) documents that extended family, neighbors, and group members offer support to women and sometimes engage directly with their husbands about abuse. Brody et al. (2015) document several studies from South Asia that describe self-help groups taking action against intimate partner violence in their communities.

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in women's mobility outside the home and other behavior altered a descriptive or prescriptive norm among males in the community about the acceptability of these behaviors.[9]

Similar to Buller et al. (2018), the third pathway captures poverty-related emotional wellbeing. It relates to an emerging literature on the psychology of poverty, showing that poverty affects individuals' mental health and cognitive function (Haushofer and Fehr 2014; Mani et al. 2013), increasing stress and negative affective states that are risk factors for men perpetrating IPV. Thus, cash transfers may decrease IPV by reducing poverty, thereby reducing stress and improving the emotional well-being of household members including men. Relatedly, transfers may also reduce conflict that arises from stretched resources and tight budgets such as those that arise from women having to ask for money for daily needs when men do not have enough to give.

To guide our subsequent analysis on pathways, we categorize different outcomes into "channels" that both underlie the various pathways and are potentially affected by TMRI. Within women's bargaining power, channels include women's economic resources, women's agency, and women's social and community support – all of which plausibly allow women to present a credible threat of leaving the relationship or settling on a noncooperative equilibrium. Within men's cost, relevant channels include women's social and community support as well, in addition to perceptions of social control and men's private costs of inflicting IPV. Within poverty-related emotional well-being, channels include household poverty and men's emotional well-being. The first two columns of Appendix 1 summarize this framework.

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[9] Haushofer and Shapiro (2018) hypothesize a related dynamic to explain spillover effects of cash transfers on IPV in Kenya, wherein changes in the perceived prevalence and/or perceived justifiability of IPV among recipient households are believed to change norms in such a way that reduces IPV in non-recipient households.

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III.   Data and estimation

III.A Data collection

Several rounds of quantitative longitudinal data have been collected on TMRI households. For the initial impact evaluation, three surveys were conducted: a baseline survey in March-April 2012 prior to the start of the intervention in May 2012, a midline survey in June 2013, and an endline survey in April 2014 just before the end of intervention. Then, to assess short-term sustainability of selected impacts as well as to measure IPV and early childhood development (ECD), a post-program survey was conducted from October 2014 to February 2015, 6 to 10 months after the intervention ended (denoted "6mPP" for "6 months post-program"). Finally, to assess longer-term sustainability of a range of impacts on households, women, and children, another post-program survey was conducted from April-May 2018, 4 years after the intervention ended (denoted "4yPP" for "4 years post-program").

The baseline, midline, and endline surveys attempted to interview all 5,000 households that were included in TMRI treatment or control groups. At baseline, in each household, the youngest child aged 0-24 months in March 2012 was identified as the "index" child. At 6mPP, because measuring ECD was an objective and the selected ECD assessment was for children 30 months or older, the sample was restricted to households with index children aged at least 30 months by October 2014. Further, due to budget constraints, the 6mPP survey included a subset of the TMRI intervention arms – in the North, (1) Cash, (2) Cash+BCC, (3) Control; and in the South, (1) Food, (2) Food+BCC, (3) Control. The 4yPP survey included a larger subset of the TMRI intervention arms – in the North, (1) Cash, (2) Food, (3) Cash+BCC, (4) Control; and in

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the South, (1) Food, (2) Cash, (3) Food+BCC, (4) Control – and attempted to re-interview all households from the baseline survey in these arms.

In the baseline, midline, and endline rounds, multi-topic surveys were conducted in respondents' homes for the main impact evaluation of TMRI, but these rounds did not include collection of IPV data. IPV was measured only at 6mPP and 4yPP. At 6mPP, the index child and the child's mother (or if she was not available, the child's primary female caregiver) were requested to go to a village center (usually a school or community club) for ECD testing, after which interviewers administered a short instrument to the woman on several topics including the child's home environment and the woman's experience with IPV. At 4yPP, multi-topic surveys were again conducted in respondents' homes. Modules that measured experience with IPV or captured female information related to IPV pathways were preferentially asked of the index child's mother or other primary female caregiver if the mother was not available, as part of a "female questionnaire" administered by a female enumerator. Modules that captured male information related to IPV pathways were preferentially asked of the female respondent's husband (usually the household head and index child's father), as part of a "male questionnaire" administered by a male enumerator.

III.B Outcomes

III.B.1 IPV

The violence questions were drawn from the internationally validated standardized Intimate Partner Violence (IPV) module in the WHO Violence Against Women instrument (Ellsberg and Heise 2005). The IPV module was administered at 6mPP and 4yPP following the WHO protocol on ethical guidelines for conducting research on women's experience with IPV (World Health

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Organization 2001).[10] These modules ask multiple behaviorally-specific questions on a range of

abusive acts, a technique shown to maximize disclosure (Ellsberg et al. 2001). We focused on

two types of violence: emotional (4 questions) and physical (6 questions). For each act of

violence, women were first asked if their current husband had ever done this. If they reported

"yes," they were asked if it had occurred in the past 12 months; if they responded that it had,

they were asked whether in the past 12 months it had occurred once, a few times, or many times.

The primary outcome measures we construct from these questions are indicators of (1)

any emotional violence experienced in the past 12 months and (2) any physical violence

experienced in the past 12 months. Each is coded as 1 if the woman responded that she had

experienced any of the acts categorized as the respective type of violence (see Online Appendix

B for the questions and categorizations) and 0 otherwise. These primary outcome measures are

identical to the outcome measures used in the 6mPP survey except for the recall period, which

was 6 months at 6mPP in order to capture only the post-program period, whereas it is the

standard 12 months at 4yPP.[11]

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[10] This included ensuring adequate training of interviewers, guaranteeing privacy during interviews, ensuring

informed consent and confidentiality of responses, interviewing only one woman per household so that other

household members were not aware that survey questions involved IPV, and providing a referral for any disclosures

of IPV.

[11] The change in recall periods does not limit our ability to conduct impact estimation at 4yPP since comparisons are

across intervention arms within the round, but it does mean prevalence estimated at 6mPP is not directly comparable

with prevalence estimated at 4yPP.

III.B.2 Pathways for IPV impacts

As outlined in Section II.B, we conceptualize three hypothesized pathways for TMRI's sustained impacts on IPV: women's bargaining power, men's costs, and poverty-related emotional well-being. For our analysis, we listed variables in the 4yPP questionnaires that were relevant to each pathway and categorized them into 7 different channels: women's economic resources; women's agency; women's social and community support; perceived social control; men's private costs; household poverty; and men's emotional well-being. The final column of Appendix 1 shows how we map outcome variables across channels. Online Appendix Table 1 provides a detailed explanation of all outcome variables.

We aggregate outcome variables into summary indices at the level of each channel. Analyzing these summary indices instead of individual outcomes has several advantages (Anderson 2008). First, a summary index can approximate a measure of an underlying latent variable in ways a single outcome measure cannot. Second, aggregating outcomes into an index reduces the probability of a false discovery by reducing the number of distinct hypothesis tests conducted; the probability of false rejection does not increase as additional outcome variables are added to a summary index (Ibid.). We choose to aggregate at the level of channels rather than pathways, because the channels provide more insight into the dynamics of what impacts are sustained and because one channel – women's social and community support – is relevant for two different pathways (women's bargaining power and men's cost).

Following Kling, Liebman, and Katz (2007) we aggregate the groups of outcome variables into standardized summary indices (channels), following the steps described in Online Appendix C. Each summary index has a mean of 0 and standard deviation of 1 for the control group, which means that the treatment effect estimates can be interpreted as the effect size

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relative to the control group, with higher scores representing more beneficial outcomes. As a robustness check, we also constructed summary indices using Inverse Covariance Weighting (ICW) following Anderson (2008). Further details on index construction are in Online Appendix C.

III.C Estimation sample

Appendix 2 shows the construction of our estimation sample. We start with all 3,000 households in the baseline survey assigned to our intervention arms of interest: Cash, Cash+BCC, and Control in the North; Food, Food+BCC, and Control in the South. We restrict our sample to the 2,733 women (one woman per household) who answered the IPV questions at 4yPP, as IPV at 4yPP is our key outcome.[12] We drop 91 women who had not been in the household at baseline, as their entry into the household may have been influenced by the program, yielding 2,642 women. Since the focus of our analysis is on the sustainability of IPV impacts at 4yPP compared to 6mPP, we further restrict the sample to the 2,416 women who had also answered the IPV module at 6mPP. Our core estimation sample is these 2,416 women, used for estimating IPV impacts at 4yPP compared to 6mPP, as well as 4yPP impacts on channels at the level of the respondent women, their households, and their communities.

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[12] In the 6mPP study (Roy et al. 2019), the sample was further restricted to women who were already part of their household and married at baseline; who had non-missing information for their husbands at baseline; and who were respondents for the women's status modules at midline and endline, to allow drawing suggestive evidence on IPV pathways from previous rounds – yielding a final estimation sample of 2,231 women. Roy et al. show that IPV impacts were similar between this sample and the larger sample of all 2,749 women who answered the IPV module at 6mPP.

Amongst the 2,416 women in our core sample, 1,989 women have complete husband data at 4yPP.[13] All are married at 4-year post program, and 96.4% said they had lived with their husband in the past 12 months. These 1,989 women are the sample on which we estimate impacts on channels related to men's emotional wellbeing and private cost of IPV.

To explore robustness, we also consider an alternative, less restrictive estimation sample throughout. This alternative sample consists of all 2,642 women in relevant intervention arms who answered the IPV module at 4yPP and were in the household at baseline, regardless of whether they were interviewed at 6mPP or not. We use the alternative sample to assess robustness of our impact estimates on IPV at 4yPP as well as robustness of impacts on channels.

III.D Attrition

Attrition from the 3,000 women in relevant arms at baseline to the 2,416 women in our 4yPP core estimation sample is about 19% – taking into account loss to follow-up over six years and our sample exclusion restrictions. Table 1 shows that, in both the North and South, attrition does not systematically differ across intervention arms. Table 2a shows that tests of joint orthogonality for baseline characteristics of women and households across arms fail to reject the

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[13] Although 2,352 of the 2,416 women were still married at 4yPP (97.4%, compared to 99.2% at baseline), 427 women have no husband data because the husband was not in the household. Not all 427 women reported the reason for the husband having left the household, but among the 237 who did, 84% reported that their husbands left the household for work and 12% said their husbands had died (3% other reasons). The proportion of women no longer married or with the husband not in the household does not differ significantly across intervention arms, thus marital dissolution or living apart is unlikely to drive differences in IPV across arms.

null in the North.[14] For the South in Table 2b, a test of joint orthogonality between the

Food+BCC arm and the control has a significant p-value of 0.01. Overall, the validity of our

experimental design appears intact in the core 4yPP estimation sample, though the results in the

South suggest a possibility of nonrandom selection into the estimation sample; we consider the

implications of this in Section IV.B.

Online Appendix Tables 2 and 3 further show that, when comparing the 3,000 women at

baseline to the sample of 1,989 women for whom impacts on husband-level channels can be

estimated at 4yPP, there are no significant differences in attrition or baseline characteristics

across intervention arms within either region. Online Appendix Tables 4 and 5 show that attrition

and balance results for the alternative sample of 2,642 women are similar to those of the core

sample.

III.E Estimation strategy

Using 4yPP data, we conduct an intent-to-treat (ITT) analysis using single-difference

estimation[15]. The randomized assignment and balance in baseline characteristics reduce concerns

of bias in the single-difference treatment estimates. Given treatment arms differed in the North

and South, we estimate impacts separately for the two regions. Since the main IPV outcomes of

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[14] We do not have baseline values for IPV outcomes, however include woman-level and household-level correlates

of IPV in Tables 2a and 2b. A small number of missing values are imputed to the mean of non-missing values in the

intervention arm by region.

[15] We do not have baseline values of the main outcomes of interest, thus cannot conduct difference-in-difference or

ANCOVA estimation.

interest are binary, we estimate probit models; equation (1) for the North and equation (2) for the

South:

$$Prob(Y_{ivN}^t = 1) = \Phi(\propto + \beta_{1N} Cash_{vN} + \beta_{2N} CashBCC_{vN} + \gamma X_{ivN}) \qquad (1)$$

$$Prob(Y_{ivS}^t = 1) = \Phi(\propto + \beta_{1S} Food_{vS} + \beta_{2S} FoodBCC_{vS} + \gamma X_{ivS}) \qquad (2)$$

where Φ is the cumulative distribution function of the standard normal distribution; Y_{ivN}^t and Y_{ivN}^t

denote the outcome for women i from village v, in region N or S (North or South), at time t

(6mPP or 4yPP). Period t denotes that we estimate the equation for both 6mPP and 4yPP

separately to assess whether impacts on IPV persist after 6mPP. $Cash_{vN}$ and $CashBCC_{vN}$ are

dummy variables for a village in the North being assigned to Cash or Cash+BCC respectively,

and $Food_{vS}$ and $FoodBCC_{vS}$ are dummy variables for a village in the South being assigned to

Food or Food+BCC respectively; corresponding coefficients reflect treatment impacts of these

arms relative to the region's control group. To test whether β_{1N} and β_{2N} for the North (and

similarly β_{1S} and β_{2S} for the South) are statistically different from each other, we conduct Wald

tests of equality and report the p-values. X_{ivN} and X_{ivS} are vectors of baseline control variables.

Adding these covariates helps increase the precision of the estimates and control for any minor

differences between intervention arms at baseline. They include all woman-level and household-

level correlates of IPV included in Tables 2a and 2b. Coefficients from probit models are

converted to average marginal effects. Finally, in all regressions we adjust standard errors for

clustering at the village level – the level of randomization.

For discrete outcomes such as frequency of IPV, or continuous outcomes such as IPV

channels (z-scores), we use standard ordinary least squares (OLS) regressions and use an

analogous specification to the above.

IV. Results

IV.A Main IPV results

Assessing sustainability of TMRI's impacts on IPV implies comparing the impacts at 4yPP with impacts at 6mPP on the same sample. In Table 3, we estimate 4yPP impacts for the North and South, as well as re-estimate impacts at 6mPP for the 4yPP core estimation sample. In the North, we find no significant impact of Cash on emotional or physical violence at 6mPP or 4yPP. By contrast, there are large and significant impacts of Cash+BCC on physical violence both at 6mPP and 4yPP and marginally significant impacts on emotional violence at 4yPP. The magnitude of the impact on physical violence increases over time from 9 percentage points at 6mPP to 14 percentage points at 4yPP. These are large impacts that represent 30 and 54 percent reductions respectively compared to the control mean. The difference in impact between Cash only and Cash+BCC is large and significant at 6mPP and at 4yPP, suggesting that linking the transfers to BCC is required for post-program impacts in both time periods.

We next examine sustainability of impacts in the South. The impacts of Food on emotional and physical IPV are not significant at 6mPP or 4yPP, and the coefficients are close to zero or positive. The impacts of Food+BCC at 6mPP are also not significant, but they are negative and relatively large in magnitude.[16] However, the impacts of Food+BCC decrease to nearly zero by 4yPP. The difference in impact on physical violence across Food and Food+BCC, while borderline significant at 6mPP, is no longer significant at 4yPP.

In the last two columns of Table 3, we compare the coefficients of Cash in the North to Food in the South and Cash+BCC in the North to Food+BCC in the South. We find no

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[16] Roy et al. (2019) find a borderline significant reduction in physical IPV from Food+BCC in the South at 6mPP, using a slight variation in estimation sample explained in footnote 12.

significant differences between Cash and Food at any time period (as neither arm had any

impacts on IPV in any period). In contrast, we find that while there were no significant

differences in impacts between Cash+BCC and Food+BCC at 6mPP, by 4yPP, there are large

and significant differences for physical violence (-.14 for Cash+BCC versus -.01 for

Food+BCC).

IV.B Robustness

We check the robustness of our results in several ways. First, we note that results on IPV impacts

at 4yPP in Table 3 are very similar to those using the alternative larger estimation sample of

2,642 women (Online Appendix Table 6). Second, we show that results in Table 3 are also

robust to linear probability models (Online Appendix Table 7). Third, Online Appendix D (with

accompanying Online Appendix Tables 8 and 9) shows that the 4yPP findings are robust to using

alternative measures of violence – indicators for the individual acts of IPV and indicators of

frequency of violence that capture the intensive margin. In fact, for emotional violence, impacts

of the Cash+BCC arm on the intensive margin (frequency) are stronger than impacts on the

extensive margin (prevalence) and range from 21 to 31 percent when compared to the control

mean.

Next, to address potential non-random selection into our estimation sample – of particular

relevance for the South – we follow Lee (2009) and bound our estimates by trimming the upper

and bottom tails of the distribution of the main IPV outcomes at 4yPP. Online Appendix Tables

10 and 11 show point estimates as well as upper bound and lower bound estimates for each

comparison.[17] Bounds are narrow and, in many cases, identical to the point estimates due to low

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[17] Each comparison is a different regression. Thus, point estimates may differ slightly from those in Table 3.

differential attrition between the treatment groups, indicating that non-random attrition does not drive results. We further examine the robustness of our results using inverse probability weights and find that results are very similar to the unweighted estimates (Online Appendix Table 12).[18]

We note that social desirability bias – the tendency to provide answers deemed to be viewed favorably by others – seems unlikely to differentially affect our results from Cash+BCC or Food+BCC arms because the BCC component of TMRI focused on nutrition, not gender issues or intra-household conflict. If social desirability bias led to similar under-reporting of IPV across all treatment and control groups, it would not bias our impact estimates. But as an additional robustness check, we assess how social desirability bias might affect our results, using a subset of five binary questions adapted from the short form of the Marlowe-Crowne social desirability scale (Reynolds 1982) and following the method outlined in Menon et al. (2016).[19] Details on the measurement and various methods we use to assess social desirability bias are presented in Online Appendix E (with accompanying Online Appendix Tables 13 and 14). The findings suggest that our main results on Cash+BCC at 4yPP are unlikely to be driven by social desirability bias.

Lastly, although Table 3 shows conceptually distinct hypotheses which each use an aggregated outcome indicator, we nonetheless address concerns about multiple hypothesis

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[18] Inverse probability weights (IPW) treatment effects were estimated using Stata's *teffects ipw* command. Our three treatment levels are (1) Cash/Food, (2) Cash+BCC/Food+BCC, and (3) Control. For such multi-valued treatments, treatment effects are estimated using a multinomial logit to predict treatment (propensity score). Controls in Tables 2a & 2b were used to predict treatment assignments.

[19] Questions aim to assess whether or not respondents are concerned with social approval, asking for example, "Are you always courteous, even to people who are disagreeable/not pleasant?"

testing by adjusting our inference to control the false discovery rate using two alternative methods (Benjamini, Krieger, and Yekutieli 2006; Benjamini and Hochberg 1995). Online Appendix Table 15 shows that our results are robust to these adjustments.

IV.C Pathways

Guided by the framework in Section II.B, we next analyze whether TMRI led to sustainable impacts on seven channels that potentially underpin our impact results– women's economic resources; women's agency; women's social and community support; perceived social control; men's private costs; household poverty; and men's emotional well-being.[20]

 Table 4 reports impact estimates on each channel at 4yPP by region. Overall, impacts on channels are stronger and have more breadth in the North than in the South. Specifically, Cash+BCC in the North leads to statistically significant positive impacts across the channels of women's economic resources, women's agency, women's social and community support, household poverty, and men's emotional wellbeing – which, together, underlie all three pathways.[21] There are also positive impacts from Cash on women's agency, household poverty, and men's emotional well-being, although these are smaller than from Cash+BCC and significantly different for household poverty. By contrast, there are no significant impacts of Food in the South, and only one borderline significant positive impact of Food+BCC, which is

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[20] These channels reflect those for which we have evidence and are not necessarily exhaustive.

[21] The 4yPP impacts of Cash+BCC on the "household poverty" channel is consistent with findings in a companion paper (Ahmed et al. 2020), which hypothesizes that sustained poverty reduction from Cash+BCC may be due to the group-based training for women expediting investment, possibly through increasing women's empowerment or psychological well-being.

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on perceived social control. Point estimates are larger for Cash+BCC in the North than Food+BCC in the South for all channels besides perceived social control – and these differences are significant or borderline significant for women's social and community support, men's private costs, household poverty, and men's emotional well-being. Taken together, the comparison of pathways impacted by Cash+BCC in the North, Food+BCC in the South, and Cash in the North suggests that broad impacts on channels may be needed for sustainable reductions in IPV. Results are robust to the restricted sample of women for whom we have husband data, to the alternative 4yPP sample, to the Inverse Covariance Weighting approach (Anderson 2008) used as an alternative method of constructing the indices, to adjustments for multiple testing, to analyzing impacts on the individual indicators comprising the channels, and to assessing Lee bounds (all estimates available upon request).

V.   Discussion and conclusions

We find that reductions in IPV from the combination of Cash+BCC in the North at 6 months post-program (Roy et al. 2019) are sustained 4 years after the program ended. At 4yPP, Cash+BCC in the North causes a 14 percentage point reduction (about 54%) in physical IPV and a 7 percentage point reduction in emotional IPV relative to the control. In contrast, Cash in the North, Food in the South, and Food+BCC in the South have no significant impacts on IPV at 4yPP.

We go beyond the results found in Roy et al. (2019) by systematically considering the pathways and channels that underpin these impacts. Consistent with the IPV impacts, impacts on channels at 4yPP are strongest for Cash+BCC in the North. Cash+BCC in the North improves women's economic resources, women's agency, women's social and community support,

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household poverty, and men's emotional well-being – channels that span all three pathways. By contrast, Food+BCC in the South has only a borderline significant positive impact on perceived social control. While Cash in the North also significantly improves women's agency, household poverty, and men's emotional well-being, we do not see significant long-term impacts on IPV from Cash alone in the North. These findings indicate that impacts on multiple channels may be needed for sustained impacts on IPV, possibly because in this study context there are multiple constraints to reducing IPV.

We cannot empirically identify what specific features of the BCC led to sustained effects on IPV pathways when it was added to cash transfers. However, it is plausible that both the content of the BCC and its group-based structure played a role – and consequently, that both the transfer of information and expansion of women's social networks contributed to the effects we see. Hoddinott et al. (2017) show that TMRI's BCC led to persistent increases in women's knowledge of infant and young child nutrition, plausibly leading women to feel better informed to make decisions and increasing their agency. Qualitative evidence also indicates that BCC participant women's new expertise increased the community's respect for them and did not provoke backlash (Roy et al. 2019). Plausibly the community's reaction was shaped by the BCC content being focused on child nutrition, a topic valued by the community and accepted as within women's domain in the study context. Moreover, the group-based approach of the BCC increased women's social networks, further improving agency and social support. Thus, in the context of TMRI in rural Bangladesh – where women's social isolation and low status likely contributed to IPV – the addition of group-based BCC appeared to sustainably address relevant IPV pathways – specifically women's bargaining power and men's cost of perpetrating violence – by providing both information and social networks.

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Our findings raise the question of why only Cash+BCC in the North reduces IPV, given that Food+BCC in the South also provided the same BCC component. One possibility is that the transfer modality is key – that is, cash is more effective in the longer term than food in improving IPV channels when combined with BCC. Although we cannot test this directly, Table 4 shows that Cash alone in the North has stronger impacts on channels than Food alone in the South. This result cannot separate the effects of modality from context, but suggests that cash may be more likely than food to sustain impacts on pathways in the longer term, particularly with respect to women's economic resources, women's agency, and household poverty. This is plausible if cash is better able to mobilize productive investments. Endline findings from TMRI support this possibility; in both the North and the South, after two years of intervention, households receiving Cash had higher ownership of livestock and poultry than those receiving Food in the same region (Ahmed et al. 2019). Four years after the program ended, Cash also led to a significantly lower proportion of households in poverty than Food within the North (Ahmed et al. 2020).

A second possibility is that context is key – that is, differences in "initial conditions" (or conditions in the absence of intervention, as reflected by the control group) determine effects on channels. Again, although we cannot test this directly, we note in Table 4 that, for each channel, a larger impact is found in the region where the initial condition is "worse." In particular, measures of women's economic resources, women's agency, women's social and community support, men's private costs, household poverty, and men's emotional well-being are all worse on average in the control group within the North than within the South; meanwhile, the program's sustained improvements in all of these appears larger in the North than in the South. The measure of perceived social control is better on average in the control group within the North

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than within the South; the program's sustained improvement in this dimension appears smaller in the North than in the South. All this is consistent with the possibility that a lower initial condition, all else equal, yields greater potential to benefit from an intervention.

Plausibly, both modality and context contribute to our findings: cash may be expected to have more sustained impacts on channels affecting IPV than food in the longer term – particularly for channels related to economic outcomes due to greater use of cash for productive investments – and a context with worse initial conditions in terms of these channels may be expected to show larger effects from intervention due to greater potential to benefit. Qualitative evidence exploring these dynamics would be useful to collect in future studies.

A related point is that we *can* conclude the differences at 4yPP between Cash+BCC in the North and Food+BCC in the South are not due to a difference in the BCC itself, as this component was highly standardized and had nearly identical participation in North and South (Roy et al. 2019). This suggests that BCC alone may not have led to sustained reductions at 4yPP – if it were to have, then we might expect the North and South to have both shown impacts at 4yPP. Also notable is that women's social and community support no longer appears affected by Food+BCC in the South at 4yPP while it is by Cash+BCC in the North. Given evidence during the TMRI program of increased social interaction in both the North and South, with no significant differences between regions (Hoddinott et al. 2017), this raises the question of why the effect seems to have faded out over time only in the South. One possibility is that reduced poverty was required for sustaining the improvement in women's social and community support – for example, that without sustained improvements in household economic well-being, which do not appear in the Food+BCC arm in the South, women went back to being socially excluded. Again, this suggests potential complementarity across channels. Overall, our findings suggest the

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possibility that Cash created the enabling environment for sustained reductions in IPV in terms of reductions in poverty, improvements in male mental health, and increases in women's economic empowerment, but additional BCC was needed for these economic improvements to actually translate into sustained reductions in IPV.[22]

We end with several interlinked observations. First, in our study context, programming that complements social protection appears critical for sustaining impacts on IPV – and moreover, for sustaining impacts on the *pathways* underlying IPV.[23] But complementary programming does not guarantee sustained impacts on IPV or its channels over the longer term. Within the same country, with identical BCC, with identical-value transfers, the impacts at 4yPP come from combining BCC with cash in the North but not from combining BCC with food in the South. Second, our 4yPP analysis provides suggestive evidence that a transfer of meaningful magnitude was also critical, implying BCC alone (although we did not test this modality) may not have led to sustained reductions in physical IPV at 4yPP. Third, suggestive evidence points to a role for the modality of the transfer. Although we cannot conclusively distinguish the effects of cash vs. food from North vs. South, results indicate that when combined with BCC, cash may better sustain reductions in IPV over the longer term. This contrasts with the shorter-term findings of Hidrobo, Peterman, and Heise (2016) in Ecuador, which showed that transfer

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[22] Relatedly, the fact that the impacts of Cash+BCC and Food+BCC on IPV did not significantly differ at 6mPP, while they did at 4yPP, suggests that habit formation is unlikely to be driving these results. If habit formation were the dominant mechanism, we would expect that similar impacts on IPV from Cash+BCC and Food+BCC at 6mPP would imply similar impacts at 4yPP.

[23] Although it is likely that cash or food transfers alone reduced IPV during the program (Roy et al. 2019), they no longer had significant impacts on physical IPV at either 6mPP or 4yPP.

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modality did *not* lead to significantly different IPV impacts during the transfer program. Fourth,

suggestive evidence points to a role for context. Impacts on channels are larger at 4yPP in the

regions where the control group is worse in terms of the channel. Finally, our findings suggest

impacting multiple channels and/or pathways may be needed in order to lead to sustained

reductions in IPV. This is an area for future research.

Tables

Table 1: Attrition from baseline sample (N = 3,000) to 4yPP estimation sample (N = 2,416)

	Full sample	North	South
Transfers	0.00	-0.02	0.03
	(0.02)	(0.03)	(0.03)
Transfers+BCC	-0.00	0.02	-0.02
	(0.02)	(0.03)	(0.03)
Constant/Control group	0.18	0.21	0.18
	(0.02)***	(0.02)***	(0.02)***
R^2	0.00	0.00	0.00
N	3,000	1,500	1,500
P-value: Transfers = Transfers+BCC	0.78	0.22	0.08

OLS coefficients reported. Full sample model includes regional fixed effects (not shown). 4yPP denotes 4 years post-program. Standard errors clustered at the village level. * $p<0.1$ ** $p<0.05$; *** $p<0.01$

Table 2a: Baseline characteristics by intervention arm, North

| | N | Means | | | P-value of diff. | | |
		Cash	Cash+BCC	Control	Cash - Control	Cash+BCC -Control	Cash - Cash+BCC
Woman's age	1,181	27.10	27.51	27.29	0.68	0.67	0.41
Woman's years of formal schooling	1,181	2.85	2.75	2.96	0.70	0.47	0.72
Woman can read and write	1,181	0.49	0.48	0.48	0.87	0.91	0.96
Woman is the spouse of HH head	1,181	0.82	0.82	0.82	0.90	0.86	0.96
Woman's number of children aged 0-5 years	1,181	1.34	1.35	1.37	0.63	0.68	0.98
Woman's number of children aged 6-15 years	1,181	0.86	0.96	0.86	0.91	0.20	0.24
Doing work that brings in cash, add'l food, or allows to accumulate HH assets	1,181	0.04	0.14	0.15	0.25	0.93	0.27
Woman's monthly labor income	1,181	0.06	0.02	0.02	0.63	0.99	0.61
Woman currently owns any savings	1,181	0.06	-0.05	-0.01	0.37	0.62	0.17
Controls money needed to buy food, clothes, medicine, and toiletries	1,181	-0.09	-0.03	-0.06	0.79	0.72	0.53
Household size	1,181	4.97	5.04	4.97	0.99	0.53	0.56
Household's total monthly consumption expenditure per capita	1,181	-0.09	-0.09	-0.11	0.56	0.75	0.95
p-value from joint F-test					0.86	0.78	0.83

P-values are reported from Wald tests on the equality of means of control and each treatment for each variable. Standard errors are clustered at the village level.
Variables with missing values imputed at the treatment group mean: Doing work […], Controls money […], Household's consumption expenditure.
Standardized variables: Doing work […], Woman's monthly labor income, Woman currently owns any savings, Controls money […], Household's consumption expenditure.

Table 2b: Baseline characteristics by intervention arm, South

| | N | Means | | | P-value of diff. | | |
		Food	Food+BCC	Control	Food - Control	Food+BCC -Control	Food - Food+BCC
Woman's age	1,235	27.53	26.70	27.36	0.74	0.20	0.10
Woman's years of formal schooling	1,235	3.54	3.71	4.07	0.06	0.23	0.56
Woman can read and write	1,235	0.60	0.64	0.67	0.06	0.41	0.34
Woman is the spouse of HH head	1,235	0.71	0.70	0.74	0.51	0.38	0.79
Woman's number of children aged 0-5 years	1,235	1.40	1.34	1.34	0.19	0.95	0.17
Woman's number of children aged 6-15 years	1,235	1.08	0.86	1.05	0.75	0.06	0.03
Doing work that brings in cash, add'l food, or allows to accumulate HH assets	1,235	-0.03	-0.17	-0.14	0.26	0.82	0.16
Woman's monthly labor income	1,235	-0.09	-0.09	-0.02	0.38	0.45	0.96
Woman currently owns any savings	1,235	0.07	-0.03	0.01	0.47	0.65	0.25
Controls money needed to buy food, clothes, medicine, and toiletries	1,235	0.10	0.07	0.06	0.65	0.88	0.77
Household size	1,235	5.46	5.26	5.54	0.57	0.06	0.17
Household's total monthly consumption expenditure per capita	1,235	0.04	-0.01	0.10	0.43	0.12	0.21
p-value from joint F-test					0.70	0.01	0.12

P-values are reported from Wald tests on the equality of means of control and each treatment for each variable. Standard errors are clustered at the village level.
Variables with missing values imputed at the treatment group mean: Doing work […], Controls money […], Household's consumption expenditure.
Standardized variables: Doing work […], Woman's monthly labor income, Woman currently owns any savings, Controls money […], Household's consumption expenditure.

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Table 3: Impacts of treatment on prevalence of IPV at 6 months and 4 years post-program, North and South

	North				South				North versus South	
	Mean of Control	Cash	Cash+BCC	P-value of Cash= Cash+BCC	Mean of Control	Food	Food+BCC	P-value of Food= Food+BCC	P-value of Cash=Food	P-value of Cash+BCC= Food+BCC
Emotional violence (in the last 6 months) at 6mPP	0.61	-0.02 (0.05)	0.02 (0.05)	0.41	0.63	0.03 (0.06)	-0.05 (0.05)	0.11	0.51	0.32
Emotional violence (in the last 12 months) at 4yPP	0.44	0.02 (0.04)	-0.07* (0.04)	0.04**	0.40	0.01 (0.04)	0.00 (0.04)	0.78	0.97	0.20
Physical violence (in the last 6 months) at 6mPP	0.30	-0.01 (0.03)	-0.09*** (0.03)	0.03**	0.22	0.01 (0.03)	-0.05 (0.03)	0.09*	0.67	0.45
Physical violence (in the last 12 months) at 4yPP	0.26	-0.04 (0.03)	-0.14*** (0.03)	0.00***	0.17	-0.02 (0.03)	-0.01 (0.02)	0.50	0.85	0.00***

Marginal effects of probit models reported. N = 2,416. Control variables include all baseline characteristics of the woman and her household shown in Tables 2a and 2b.
6mPP denotes 6 months post-program, 4yPP denotes 4 years post-program. Standard errors clustered at the village level. * $p<0.1$ ** $p<0.05$; *** $p<0.01$

Table 4: Impact of treatment on IPV channels at 4 years post-program, North and South

	North				South				North versus South	
	Mean of Control	Cash	Cash+BCC	P-value of Cash= Cash+BCC	Mean of Control	Food	Food+BCC	P-value of Food= Food+BCC	P-value of Cash=Food	P-value of Cash+BCC= Food+BCC
Women's economic resources	-0.07	0.10 (0.07)	0.19** (0.08)	0.20	0.06	-0.10 (0.08)	0.03 (0.09)	0.11	0.06*	0.16
Women's agency	-0.18	0.19** (0.08)	0.25*** (0.09)	0.54	0.17	-0.08 (0.09)	0.10 (0.10)	0.07*	0.03**	0.29
Women's social and community support	-0.04	0.08 (0.10)	0.25** (0.10)	0.14	0.04	-0.05 (0.10)	0.00 (0.10)	0.58	0.37	0.09*
Perceived social control	0.21	0.00 (0.12)	0.06 (0.11)	0.62	-0.20	0.02 (0.17)	0.23* (0.13)	0.19	0.93	0.33
Men's private cost	-0.08	0.04 (0.09)	0.12 (0.09)	0.33	0.08	-0.06 (0.08)	-0.12 (0.08)	0.52	0.41	0.05*
Household poverty	-0.35	0.20** (0.08)	0.39*** (0.09)	0.03**	0.33	-0.10 (0.09)	0.15 (0.09)	0.01**	0.01**	0.07*
Men's emotional well-being	-0.06	0.18* (0.11)	0.27** (0.11)	0.42	0.06	-0.04 (0.09)	0.00 (0.10)	0.70	0.11	0.06*

OLS coefficients reported with standard errors in parentheses (clustered at the village level). N=2416 (North=1181; South=1235) for all indices except private costs and emotional well-being of men [both N=1989 (North=1012; South=977)].Channels are constructed following Kling et al. (2007) and standardized to the control group. As described in Section II.B, social and community support of women can also be conceptualized as cost of men, however they were estimated separately here to allow for mutually exclusive channels. For the household poverty channel, higher values indicate lower poverty. Control variables include all baseline characteristics of the woman and her household shown in Tables 2a and 2b. * p<0.1 ** p<0.05; *** p<0.01

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Appendix 1: Operationalization of pathways

Pathway	Channel (summary index)	Outcome variables (index components)
Women's bargaining power	Women's economic resources	1. Woman works for cash, food, or asset accumulation; 2. Monthly labor income index; 3. Control over money needed to buy food, clothes, medicine, or toiletries/cosmetics; 4. Index for value of assets solely owned; 5. Ownership of savings
	Women's agency	6. Locus of control index; 7. Self-ranking on 9-step ladder of having rights; 8. Self-ranking on 9-step ladder of ability to change life; 9. Perceive success/failure as own responsibility vs. destiny; 10. Gender norms index; 11. Attitudes about IPV; 12. Exposure to places outside of home index; 13. Ever using radio or TV; 14. Ownership of mobile phone
	Women's social and community support *	15. Level of social capital: someone to help in time of need; 16. Level of social capital: meeting with women to discuss issues; 17. How often do you see family or friends; 18. Participation in savings group
Men's costs	Perceived social control	19. Woman's level of perceived social cohesion; 20. Women's perception that community would intervene in cases of IPV; 21. Village leader's perception that community disagrees with justifying IPV; 22. Village leader's perception that community would intervene in cases of IPV
	Men's private costs	23. Male's gender norms index; 24. Male's attitudes about IPV
Poverty-related emotional well-being	Household poverty	25. Total monthly household consumption per capita; 26. Household Food Insecurity
	Men's emotional well-being	27. Men's stress; 28. Men's depression; 29. Men's locus of control

* The "women's social and community support" channel pertains to both the "women's bargaining power" pathway and the "men's costs" pathway.

Appendix 2: Flow chart of estimation sample

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┌─────────────────────────────────────────────┐
│ 3,000 households interviewed at baseline in  │
│          relevant intervention arms          │
└─────────────────────────────────────────────┘
                      │
                      ▼
┌─────────────────────────────────────────────┐
│ 2,733 women interviewed on IPV at            │
│          4 years post-program                │
└─────────────────────────────────────────────┘
                      │
                      ▼
┌─────────────────────────────────────────────┐
│ 2,642 women in surveyed baseline households  │
└─────────────────────────────────────────────┘
                      │
                      ▼
┌─────────────────────────────────────────────┐
│ 2,416 women also interviewed on IPV at       │
│          6 months post-program               │
└─────────────────────────────────────────────┘
              │                    │
              ▼                    ▼
┌──────────────────────────┐  ┌──────────────────────────────┐
│ 1.989 women with husband │  │ 427 women without husband data│
│          data            │  │                                │
└──────────────────────────┘  └──────────────────────────────┘
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