

**Reducing chronic undernutrition through nutrition
sensitive social protection:
Evidence from Bangladesh, lessons for Ethiopia**

John Hoddinott

November 2019

Drawing on work with Akhter Ahmed and Shalini Roy



Cornell University
Division of Nutritional Sciences

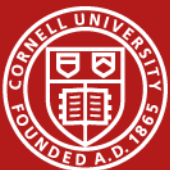
Introduction

- Reducing undernutrition is of intrinsic and instrumental value
- Reducing chronic undernutrition requires investments in nutrition-sensitive social protection and agriculture
- Existing evidence from Ethiopia and elsewhere indicates that “just” providing cash or food has limited effects on chronic undernutrition
- This presentation:
 - Describes results from a nutrition-sensitive SP intervention in BangladeshAnd
 - Describes relevance/implications for Ethiopia



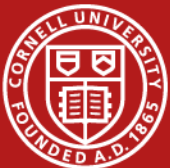
Transfer Modality Research Initiative

- Two randomized control trials (one in northern Bangladesh; one in the south) with common elements, the Transfer Modality Research Initiative (TMRI) undertaken in collaboration with World Food Programme
- Two year duration (June 2012 – May 2014) with the following treatment arms
- Monthly cash transfer (north & south) of Tk 1,500 (~19 USD or ~ 550 birr)
- Monthly food transfer (north & south) of 30 kg of rice, 2 kg of lentils, 2 liters of micronutrient fortified cooking oil
- ½ Food AND ½ cash (north & south): Tk 750 (~275 birr), 15 kg of rice, 1 kg of lentils, 1 liter of micronutrient fortified cooking oil
- Controls (north & south)
- Monthly cash transfer AND Nutrition behavior change communication (north)
- Monthly food transfer AND Nutrition behavior change communication (south)



TMRI: Design

- TMRI targeted two poor regions, one in the north, one in the south. Within these regions, poor upazilas (woredas) were selected and villages (kebeles) selected within these upazilas
- Participants had to: be poor; have at least one child aged 0-24 months; and not receive benefits from other safety net interventions. In each village, ten poor households meeting these criteria were randomly selected
- Transfers given to mothers. Transfer value was around 25% of monthly income
- Food ration and cash transfer were of equivalent value at baseline
- Intervention takes place in localities where market access is good; neither cash or food transfers affected food prices



TMRI: Behavior Change Communication - Design

- Core component was weekly group meeting of 9-15 mothers with a trained community nutrition worker (CNW). Some meetings also included mothers-in-law, husbands or other household members
- Weekly meetings followed a curriculum covering: (1) overall importance of nutrition and diet diversity for health; (2) WASH; (3) micronutrients; importance and dietary sources; (4) best breastfeeding practices (5) complementary feeding; (6) maternal nutrition.
- In addition to presentations by CNW, there were discussions, role playing and songs
- CNWs visited beneficiaries in their homes to observe household level practice and encourage the adoption of positive behaviors.
- They also met with influential community leaders to discuss the messages they were conveying to mothers.
- BCC added approximately 20% to cost of intervention



TMRI: Data collection

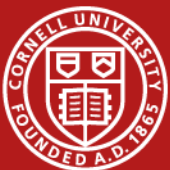
- Baseline survey, carried out in March-April 2012 (just before the start of transfers)
- Endline survey was conducted in April 2014, before last transfers were made.
- Attrition is low, 3.5% in North and 2.2% in the South, and random
- Both adult males and adult females completed (separate) questionnaires
- Qualitative fieldwork conducted focusing on payment processes, BCC, and participant experiences with the intervention



TMRI: Implementation Transfers

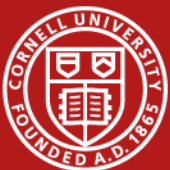
- Payments were successfully implemented
 - Transfer provided in a timely and complete fashion
 - Pay points easily accessible (median one-way travel time 30 minutes)
 - Payments made efficiently (median wait time 30 minutes)
 - Rare for respondents to report problems with use of mobile phones for transfers (< 5%)
 - Few household sell ration (~2%)
- BCC was successfully implemented
 - In North and South, median household receiving training attended approx. 48 sessions per year; each session approx. one hour
 - Approx 83% of respondents reported that if they missed a session, the nutrition worker followed up with a home visit
 - Careful attention paid to training of CNWs; they scored high on a BCC knowledge quiz given at the end of the study

No meaningful differences in transfer implementation across different treatment arms



Baseline Child (0-24m) Characteristics

	North	South
Female (percent)	47.5	49.2
Height for age z score (HAZ)	-1.78	-1.63
Stunted (percent)	45	39
Weight for height z score (WHZ)	-0.76	-0.86
Wasted (percent)	13	15
Mean number of food groups consumed	1.86	2.14
Children consuming 4+ food groups (percent)	7.5	14.4



Impacts on anthropometry: Basic Results

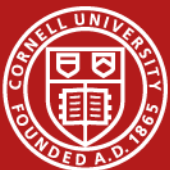
- For the north:

$$\text{Anthropometric outcome}_{\text{endline}} = \beta_1 \cdot \text{Cash} + \beta_2 \cdot \text{Food} + \beta_3 \cdot \text{Cash\&Food} + \beta_4 \cdot \text{Cash+BCC} + \varepsilon_{\text{endline}}$$

- For the south:

$$\text{Anthropometric outcome}_{\text{endline}} = \beta_5 \cdot \text{Cash} + \beta_6 \cdot \text{Food} + \beta_7 \cdot \text{Cash\&Food} + \beta_8 \cdot \text{Food+BCC} + \varepsilon_{\text{endline}}$$

- β 's are parameters to be estimated.
- ε 's are the disturbance terms in each regression.
- Estimated standard errors (in parentheses) account for clustering



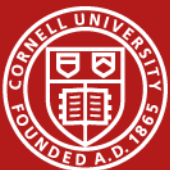
Impacts on anthropometry, endline: Basic Results (Children 0-48m)

North			South		
Treatment	HAZ	WHZ	Treatment	HAZ	WHZ
Cash only	0.035 (0.08)	-0.013 (0.07)	Cash only	-0.097 (0.08)	-0.088 (0.08)
Food only	0.048 (0.08)	0.090 (0.06)	Food only	-0.100 (0.09)	-0.044 (0.08)
Cash&Food	0.119 (0.00)	-0.041 (0.07)	Cash&Food	0.024 (0.08)	-0.017 (0.08)
Cash+BCC	0.248*** (0.08)	0.022 (0.06)	Food+BCC	0.079 (0.08)	-0.042 (0.08)

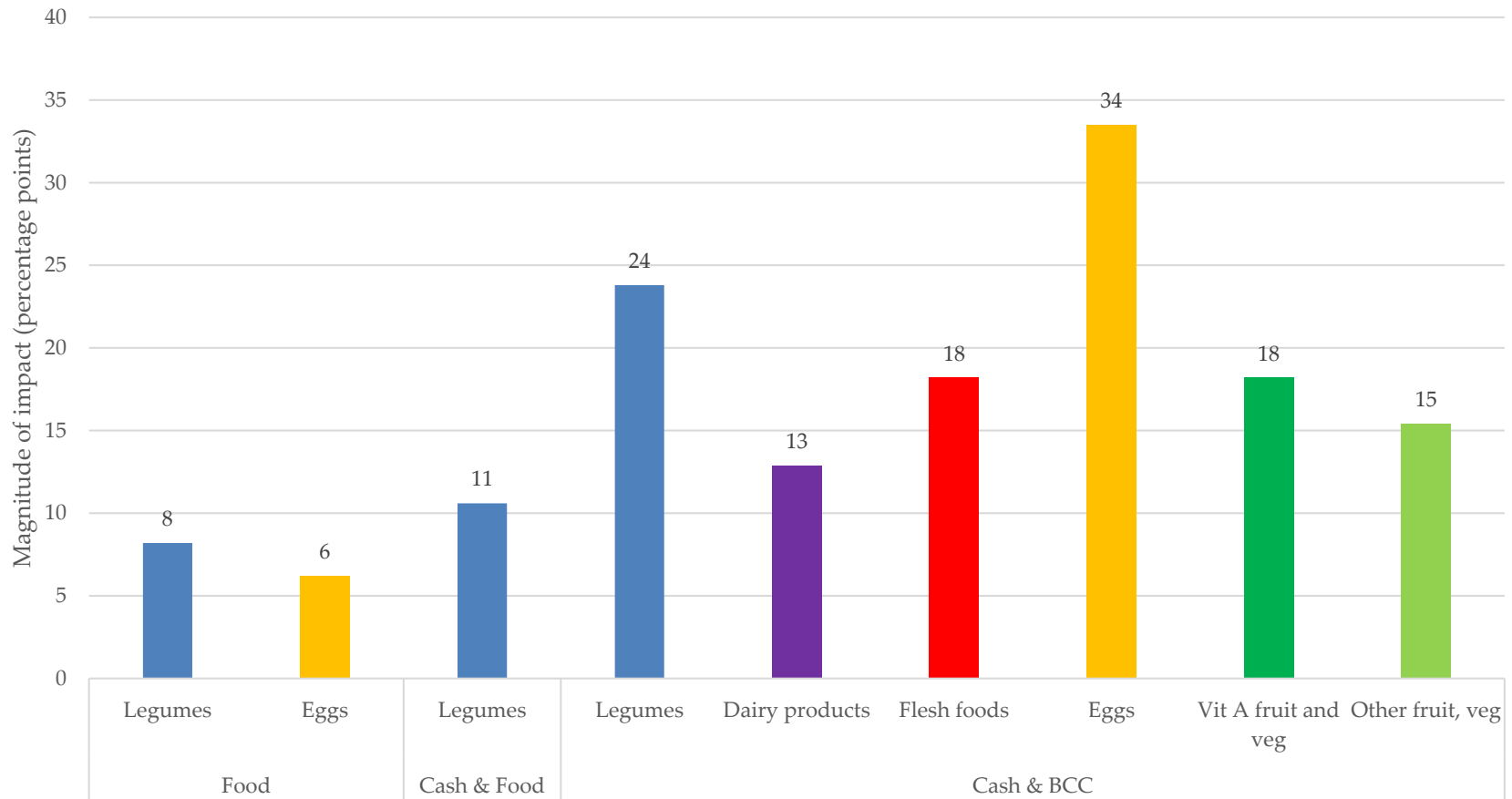


Impacts on anthropometry: Robustness checks

- The height results for Cash+BCC are robust to alternative specifications of the dependent variable. Stunting falls by seven percentage points
- Results for Cash+BCC are robust to inclusion of additional controls and changes in sample
- The “non-impact results” for height in the South are robust to alternative specifications of the dependent variable and to the inclusion of additional controls.
- The “non-impact results” for weight-for-height in both the North and South are robust to alternative specifications of the dependent variable and to the inclusion of additional controls.
- There is no difference in impact of Cash+BCC on HAZ in the North when we disaggregate by child sex

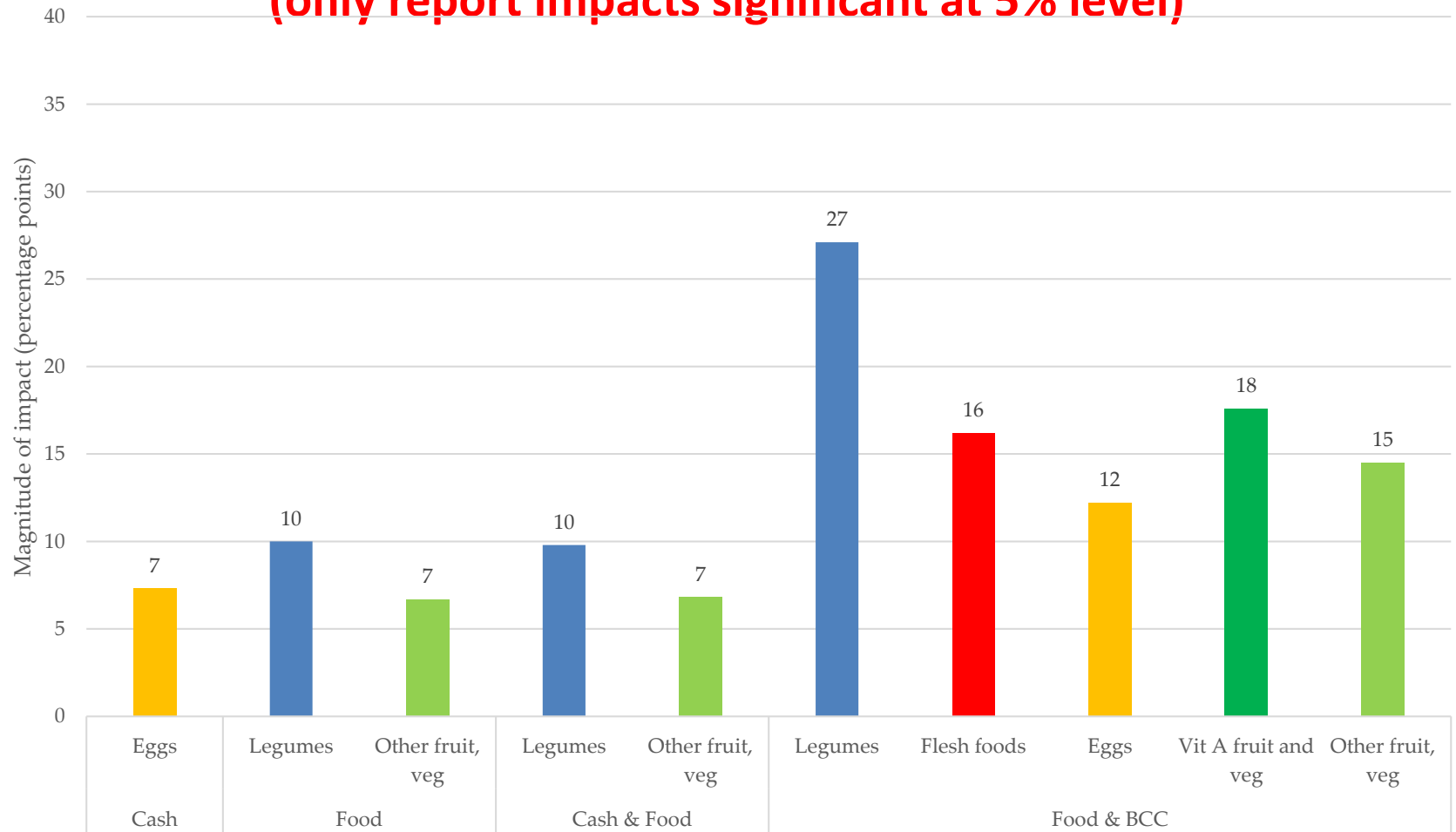


TMRI: Impact on child (6-41m at endline) diet by treatment arm, North (only report impacts significant at 5% level)



TMRI: Impact on child (6-41m at endline) diet by treatment arm, South

(only report impacts significant at 5% level)



Impacts on caloric, protein and choline intake at endline

(Offspring of head, 6-48m at endline)

North

T	Calories (kcal)	Protein (grams)	Choline (mg)
Cash	39.2	1.27	-19.39
	(26.4)	(0.75)	(17.26)
Food	44.7	1.74**	7.29
	(25.4)	(0.73)	(16.61)
Cash&Food	54.5**	2.01***	1.88
	(25.7)	(0.73)	(16.80)
Cash+BCC	220.4***	8.20***	105.90***
	(26.3)	(0.75)	(17.19)

South

T	Calories (kcal)	Protein (grams)	Choline (mg)
Cash	55.0**	1.69**	-25.36
	(27.3)	(0.84)	(15.64)
Food	42.0	1.69**	-6.70
	(26.7)	(0.82)	(15.28)
Cash&Food	35.1	0.84	3.68
	(27.2)	(0.84)	(15.60)
Food+BCC	159.1***	4.93***	12.54
	(27.7)	(0.85)	(15.89)



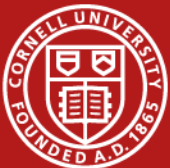
Other results

- In each survey round, the caregiver of the index child was asked 18 questions relating to infant and young child nutrition. In both the North and South, BCC increased the number of questions correctly answered. No other treatment arms increased maternal knowledge of IYCN.
- Relative to Cash only, Cash+BCC also leads to:
 - (Modest) reductions in illness
 - Improved WASH practices
- Relative to Food+BCC, Cash+BCC also leads to:
 - (Modest) reductions in fever (but not other illness)
 - But no clear pattern on child care:
 - Impacts higher for Cash+BCC for child defecates in latrine
 - Impacts higher for Food+BCC for number of feedings, child bathed with soap, mother washes hands with soap



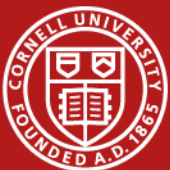
Why might differences in animal source foods matter?

- Rapid advances are occurring in metabolomics – the study of small molecule chemicals that are the consequence of metabolic processes.
- Improvements in our understanding of mTORs (mechanistic target of rapamycin) is an example
- mTORs are catalytic proteins. They signal (or regulate) anabolic cellular processes such as growth and differentiation. This signaling process integrates information about the availability of nutrients (food sources, oxygen, and growth factors).
- One type, mTORC1, when activated, regulates growth in:
 - Chondral plates (ie part of the bone where growth takes place)
 - Skeletal muscle growth
 - Myelination of nervous system



Why might differences in animal source foods matter?

- Semba et al (2016) argue that amino acids are essential for the activation of mTORC1. When these are absent:
 - The body represses protein and lipid synthesis and cellular growth
 - Bone growth is restricted
- Essential amino acids cannot be synthesized from scratch within the human body; these must be obtained via diet. The best sources are animal source foods (meat, poultry, fish, eggs). Plant sources also contain these, but typically in much lower concentrations.



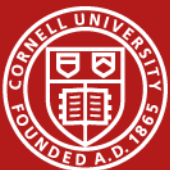
Why might differences in animal source foods matter?

- Metabolomic work has also focused attention on choline, an essential nutrient.
- Choline is needed for the synthesis of phosphatidcholines; this synthesis is needed for bone formation and cell membrane formation.
- Eggs are an excellent source of choline. Flesh foods (beef, chicken) are other sources.
- In addition, cow's milk (in addition to being an important source of animal-source protein, amino acids, calcium, iron, and vitamin B-12) stimulates the secretion of insulin-like growth factor I (IGF-I), the hormone that stimulates bone and tissue growth



Implications for Ethiopia

- In the absence of BCC, social protection interventions are unlikely to be effective in terms of reducing chronic undernutrition
- There are three important features of the TMRI BCC relevant to Ethiopia:
 - Intensity of interaction
 - Emphasis on problem solving
 - Benefits of group formation
- Payments:
 - Level (25% baseline income)
 - Frequency (monthly)
 - Reliability (excellent)



Implications for Ethiopia

- Market access (In Bangladesh, easy access to wide range of foods)
 - Access to flesh foods and dairy is limited in poor rural areas of Ethiopia
 - Eggs are widely available but, relative to staples are expensive in terms of birr/calorie
- Payment modality
 - “Give beneficiaries food, they will consume that food”
 - PSNP beneficiaries generally prefer food payments to cash, largely because the value of food payments exceeds cash and because of concerns regarding price volatility
 - But TMRI results suggest that diversifying food consumption is important for child nutrition
 - Cash provides the ability to purchase a more diverse diet, provided diverse foods are available in market



Bangladesh, Transfer Modality Research Initiative

CO-PRINCIPAL INVESTIGATORS

AKHTER AHMED, JOHN HODDINOTT, SHALINI ROY

We thank Ishita Ahmed, Melissa Hidrobo, Naureen Karachiwalla, Amy Margolies, Wahidur Quabili, Esha Sraboni and DATA for their contributions to the wider TMRI study

FUNDERS

Ministry for Economic Cooperation and Development (Germany), Department for International Development (UK), Swiss Agency for Development and Cooperation, United Nations Development Programme, United States Agency for International Development, World Bank

CONFLICTS OF INTEREST

None Declared

