Contribution of foods produced at home vs. purchased to adult and child dietary diversity and child nutrient intakes: Results from the EFFECTS trial

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ANH2023 Agriculture, Nutrition and Health Academy Week

https://www.anh-academy.org/academy-week/2023

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Introduction

- **Undernutrition in childhood** is associated with **mortality**, **poor growth** and **poor health[1]**
- **Markets** access is associated with better diets, but nutrition interventions typically focus on diversifying **home production[2]**

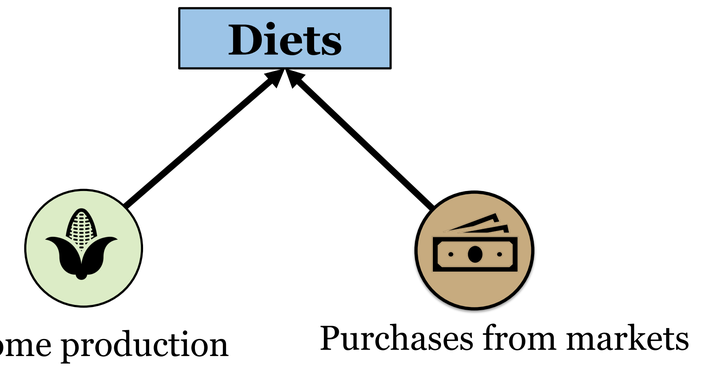


Figure 1. Conceptual framework. Households in rural East Africa primarily source foods from their own production and from markets.

Methods

The Engaging Fathers for Effective Child Nutrition and Development in Tanzania (EFFECTS) Study:

- Cluster-randomized controlled trial. ClinicalTrials.gov: NCT0375982
- In 80 villages, 960 households with young children (≤18 months) + both parents

Interventions:

- 2x2 factorial + standard of care (control)
  - All intervention arms engaged mothers and received gender-responsive nutrition content (e.g., home gardening, saving & budgeting, complementary feeding, responsive feeding, partner communication)
- Two arms additionally engaged fathers alongside mothers ("**Couples**") and provided content on e.g., gender norms and healthy relationships
- Two arms additionally provided parenting content (e.g., stimulation, positive discipline) alongside nutrition content ("**Bundled**")

Variables:

- Diversity of foods produced, and diversity of foods purchased (each score 0-10 to match Diet Diversity for Women[3])
- Nutrient intakes for children, calculated from 24-hour food recall
- Dietary diversity for women, men, and children, calculated from a food frequency questionnaire

Statistical analyses:

- Linear mixed models, adjusting for village-level clustering
- Difference-in-difference analyses also adjusted for repeated measures at the household level
- Tested the effect of any intervention vs. control; effect of engaging fathers (Couples vs. Mothers); effect of bundling parenting content alongside nutrition content (Bundled vs. Nutrition); and whether effect of engaging fathers depends on content delivered

Research Question 1: What are the baseline associations between food sources (home production & market purchases) and child nutrient intake?

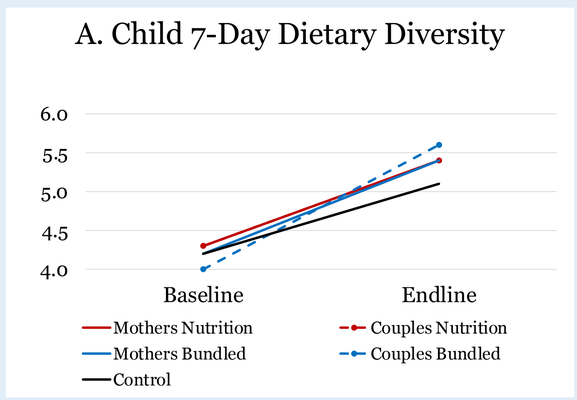
	Median (Q1, Q3) Or %
Age of child, months	15 (12,18)
Child still breastfeeding (n 581)	74.9%
Number of times breastfed (n 581)	4 (0,5)
Stunting (n 576)	33.0%
Child received vitamin A supplement (previous 6 months)	41.2%
Minimum Dietary Diversity[4]	33.6%
Purchase diversity	3 (2,4)
Production diversity	3 (2,4)

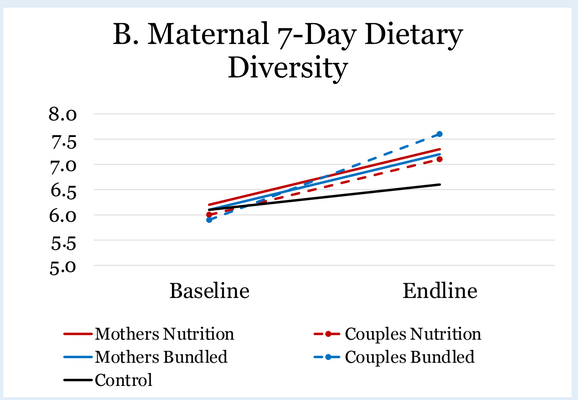
Table 1. Demographics of children aged 9-23 months at baseline, for whom we have 24-hour food recall data (n= 587 unless otherwise noted). Most children were still breastfeeding. The households in which these children lived relied equally on purchases and production for household dietary diversity (typically 3 food groups each from purchases and production).

	Total intake Median (Q1, Q3)	RNI[5] 9-11 months/12-23 months	Associated with food source?
Energy[6]	111 (84, 146)	80 kcal per kg body weight	Market purchases
Protein[7]	2.7 (1.9, 3.8)	1.31/1.14 g per kg body weight	-
Vitamin A	322.9 (267.5, 425.0)	400 μg RE	Home production
Vitamin B6	0.5 (0.3, 0.7)	0.3/0.5 mg	-
Folate (B9)	98 (74, 131)	80/150 μg	Home production
Vitamin B12	1.6 (0.6, 3.4)	0.7/0.9 μg	Market purchases
Vitamin C	34 (25, 54)	30 mg	Home production
Fiber[8]	9.6 (6.1, 14.4)	19 g	Home production
Iron	5.1 (3.2, 7.3)	18.6/11.6 mg	-
Zinc	3.8 (2.4, 5.3)	8.4/8.3 mg	Market purchases
Calcium	402 (227, 916)	400/500 mg	-

Table 2. Before the intervention, production diversity and purchase diversity each contributed to the intake of essential nutrients. Greater production diversity is associated with intake of vitamin A, folate, vitamin C, and fiber. Greater purchase diversity is associated with intake of energy, vitamin B12, and zinc.

Research Question 2: Can nutrition interventions improve dietary diversity and the diversity of foods purchased and produced?





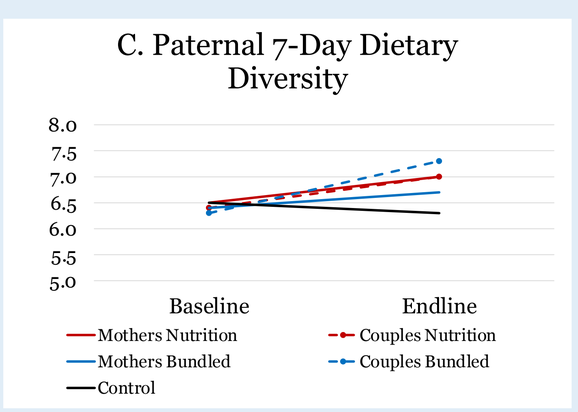


Figure 2. Any EFFECTS intervention improved 7-day dietary diversity of children (A) and mothers (B) (both p<0.01), with additional improvements when participants were provided bundled nutrition + parenting content (both p<0.05). Any EFFECTS interventions improved 7-day dietary diversity of fathers (C) (p<0.001), with further improvements when fathers were engaged alongside mothers and provided bundled content (p<0.01).
For all outcomes, the greatest increase compared to control occurred when couples were provided bundled content (p<0.01).

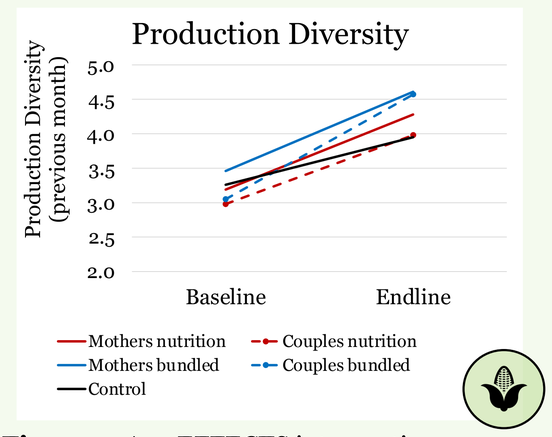


Figure 3. Any EFFECTS intervention increased household production diversity (p<0.05) with no further benefit from providing bundled content or engaging fathers (p>0.05).

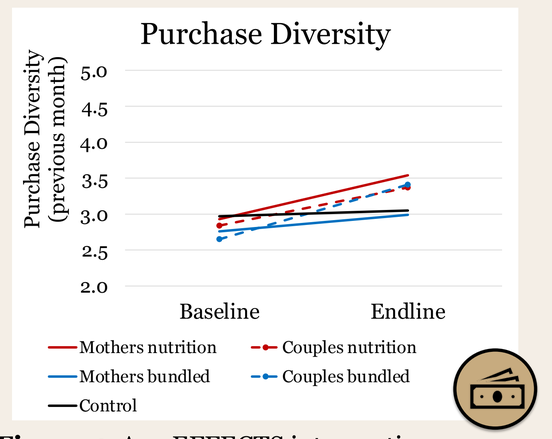


Figure 4. Any EFFECTS intervention increased household purchase diversity (p<0.05) with no further benefit from providing bundled content or engaging fathers (p>0.05).

The EFFECTS interventions improved dietary diversity of individuals, likely in part due to improved access to diverse foods through both purchasing and production. Additional improvements with bundled content and father engagement are likely due to changed behaviors such as improved couples' communication, father engagement in preparing food, and responsive feeding.

Conclusion

Nutrition interventions in rural areas should be designed to utilize both pathways of food acquisition - home production and market purchases - to improve diets. Engaging fathers and providing bundled parenting + nutrition content may lead to greater improvements in nutrition outcomes.

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Acknowledgments

Funding provided by:
Eleanor J. Crook Foundation
Conrad N. Hilton Foundation
1000 Days
Risk Pool Fund

Project Partners:
Global Communities
Project Concern International
Harvard T.H. Chan School of Public Health
Africa Academy of Public Health
National Institute of Medical Research