

The Impact of Maternal Health and Nutrition Status on Child's Health and Socioeconomic Outcomes

-Randomized Controlled Trial in Malawi-

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2012.06

Aim of the project

- To implement a birth cohort study in the African context
 - ▶ Large scale
 - ▶ Long-term
 - ▶ With exogenous shocks
 - ★ a series of early childhood randomized interventions
 - ▶ Collect a wide range of data: socioeconomic and health measures, and biomarkers(including DNA).
 - ▶ Open to the possibility of future interventions (such as schooling)

Project Malawi

- Project title : Project Malawi (www.project-malawi.org)
- \$2m funding from Korean government
- HIV/AIDS and Mother and Child Health (MCH) projects
- Research area : Lilongwe, Malawi



- ▶ Number of group villages : 600
- ▶ Number of villages : 1,000
- ▶ Number of estimated pregnant women per year : 4,000

Current Interventions

- Pre-natal support: WHO standard package
 - ▶ 10kg of food (combination of maize, soya, and vegetable oil) per month
 - ▶ micro-nutrients (Vitamin A, Iron, Iodine and Folic acid)
 - ▶ malaria prevention (Bednet and prophylaxis)
 - ▶ anti-parasite medicine (Albendazole)
 - ▶ promotion of prenatal care in nearby health centers
 - ▶ promotion of facility delivery through transportation voucher.

- Post-natal support: WHO standard package
 - ▶ 10kg of food (combination of maize, soya, and vegetable oil) per month
 - ▶ micro-nutrients (Vitamin A, Iron, Iodine and Folic acid)
 - ▶ malaria prevention (Bednet and prophylaxis)
 - ▶ anti-parasite medicine (Albendazole)
 - ▶ promotion of postnatal care in nearby health centers (such as vaccination)
 - ▶ formula with clean water for infant after 6 months

Research Questions 1 : Impact

- Q1: [Impact] How do prenatal and postnatal health care and nutrition support interventions affect the well-being of children and their mothers?
 - ▶ No consensus on critical timing
 - ▶ Fetal Origin Hypothesis
 - ★ Almond et al (2005); Behrman and Rosenzweig (2004); Balck, Devereux and Salvanes (2007), Susser (1994; Almond and Mazumder (2005); Lee(2011)
 - ▶ Life Course Model
 - ★ Maccini and Yang (2009); Fertig (2005) ; Glewwe, Jacoby and King (2001); Anderman, Hoddinott and Kinsey (2006); Hoddinott et al. (2008)

Research Questions 2 : Human Capital Complementarity

- Q2: [Complementarity] How big is the interaction of prenatal and postnatal interventions?
 - ▶ little credible evidence
 - ▶ Duflo, Dupas, Kremer (2011) - interaction between school uniform distribution and HIV/AIDS teacher training

Research Questions 3 : Heterogeneity

- Q3: [Heterogeneity] What is the differential effect of these interventions among families of various characteristics?
 - ▶ by socioeconomic and demographic status
 - ▶ by genotype
 - ★ gene-environment interaction (Caspi, 2002)

Research Questions 4 : Parental Response and Mechanism

- Q4A: [Parental Response] What are the parental behavioral responses to these interventions?
 - ▶ complements or substitutes?
- Q4B: [Mechanism] What are the mechanisms involved from intervention to outcomes
 - ▶ health status?
 - ▶ cognitive function(IQ)?
 - ▶ attitudes such as time and risk preference?

Baseline Survey

- Baseline survey covers:
 - ▶ Basic demographics
 - ▶ Weight and Height
 - ▶ Household roster
 - ▶ Education, Employment, Marriage, Birth history
 - ▶ Children's health and nutrition
 - ▶ Contraception, Sexual behavior
 - ▶ HIV/AIDS related question
 - ▶ Consumption
 - ▶ Credit history
 - ▶ Unexpected events
 - ▶ GPS
 - ▶ HIV testing, Blood pressure, Hemoglobin level, Urine test, Pregnancy test (if necessary)
 - ▶ (future) Saliva 5ml and Blood 8ml for gene research

Randomization of Interventions

- Delivering food is a "logistical nightmare"



- Group village level randomization

Group	Number	Group 1	Group 2	Group 3	Group 4
Number of DSA area	600	150	150	150	150
Number of Villages	1000	250	250	250	250
Number of Pregnancies	4000	1000	1000	1000	1000
Treatment	Prenatal	NO	YES	NO	YES
	Postnatal	NO	NO	YES	YES

- Expanded through routine pregnancy registry

Follow-up Surveys and Routine Pregnancy Registry

- Routine Pregnancy Registry
 - ▶ We plan to continue to register new pregnancies (ongoing basis)
- Annual Follow-up Surveys
 - ▶ Outcome variables for mother :
 - ★ mortality, postpartum fever and infection, breastfeeding, length of hospitalization, weight, fertility, child caring behavior, and labor market participation.
 - ▶ Outcome variables for child :
 - ★ mortality, weight, height, health (fever, diarrhea, etc), cognitive function, educational and economic achievements

Evaluation Strategy:ITT

- The reduced form regression model is

$$\text{Outcome}_{ij} = \alpha + \beta_1 \text{Pre}_j + \beta_2 \text{Post}_j + \beta_3 \text{Both}_j + \gamma X_{ij} + \epsilon_{ij}$$

where

Outcome is outcomes for individual i

Pre, Post and Both are dummies for each treatment

X is a set of control variables

errors are clustered at the group village level