FEED THE FUTURE
The U.S. Government's Global Hunger & Food Security Initiative

Feed the Future Innovation Lab for Livestock Systems

Cracking the Potential of Eggs to Improve Child Growth and Development

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Inadequate and less diverse diets during critical life stages including pregnancy, lactation, and infancy contribute to malnutrition of children, particularly in low- and middle-income countries (LMICs). The first thousand days post-conception have been identified as a critical period of potential intervention within which to reduce stunting and improve early childhood development. Previous studies have repeatedly demonstrated that child growth stunting often begins in utero and is directly related to maternal nutrition. In LMIC, typical diets are less diverse compared to diets in high-income countries and often lack animal source foods (ASF), which are a rich source of bioavailable macro and micro-nutrients but are limited by barriers specific to LMIC. Recent research indicates that upon the introduction of complementary foods, the consumption of eggs by infants and young children can improve nutritional outcomes. Given the alignment of nutrient demand during pregnancy and lactation, nutrient composition and bioavailability in ASF, and increased evidence of the benefits of ASF in children's diets, increased maternal ASF consumption during pregnancy and lactation may improve child growth and development. This study aims to investigate how the consumption of eggs during a woman's pregnancy may affect child growth.

Objectives

The overarching aim of this project is to test the effects of maternal egg consumption during pregnancy on birth length. The project will also investigate the relationship between maternal egg consumption and other birth outcomes.

Specific Objectives

1. To improve prenatal and postnatal maternal health indicators
2. To improve child's growth outcomes at birth and at 6 months through improved maternal nutrition

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Research Approach

Using a randomized controlled trial, this study will investigate the effect of maternal egg consumption during pregnancy on birth outcomes. All enrolled mothers in the study will receive the standard of care for pregnant women, as outlined by the Government of Rwanda (GoR); health insurance, if they are not previously covered; and engagement in additional clinical assessment during pregnancy by the research team. Any enrolled mother not receiving 6 kg of Shisha Kibondo (SK), a government-distributed nutrient dense plant-based food, per month, per GoR standard of care for mothers who are undernourished, will receive 6 kg/month of a fortified flour (CSB+) that is nutritionally comparable to SK during pregnancy. Participants will include mother-child dyads: pregnant women will be recruited, enrolled, and followed, with their children through child age of six months.

In addition to those items outlined above, in treatment arm one (T1) mothers will receive two eggs per day; and in treatment arm two (T2), mothers will be asked to consume their typical-diet. Dietary supplements will be initiated upon enrollment (9-14 weeks gestation) and will continue through childbirth.

Primary Outcomes

- Child length at birth

Secondary Outcomes

- Fetal brain development
- Child weight at birth
- Child neurocognitive development at birth and 6 months of age
- Other birth outcomes such as preterm births, miscarriage, small for gestational age
- Child growth outcomes such as wasting, stunting at birth and at 6 months of age
- Maternal health indicators during pregnancy and after birth
- Postpartum mental health of mothers

Institutional Partners

- National Child Development Agency, NCDA
- Rwanda Agriculture and Animal Resources Development Board, RAB
- Rwanda Biomedical Centre, RBC